

# Railroad Age Gazette

Including the Railroad Gazette and The Railway Age

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The Hedschas Railway, built for pilgrims to Medina and Mecca, for several hundred miles north of Medina, was built chiefly by Turkish engineer troops, who had been instructed in the several necessary trades, especially stone-cutting and masonry, for the purpose. The thermometer on the sandstone and lava desert goes up to 130 deg.; there is one stretch of 120 miles without water, which is scarce almost everywhere; and under these circumstances, cost of transportation being great, contractors refused to bid. The work has been rushed for the last two years, and perhaps half of the road is barely in condition for trains running 10 miles an hour; but considerable advantages are obtained by having such a route for materials, etc. There is some population about Medina, but further north there are only a few oases, and elsewhere no permanent population. When the rare rains have produced some vegetation, nomads drive their herds there while it lasts. There is one short tunnel through sandstone, and in several places the road has been laid around sand dunes, which are for the most part stable if the surface is not broken. For several hundred miles the stations are loop-holed for musketry and barracks provided for a guard as a defence against Bedouins, who, however, have not resisted the construction of the railway, as was feared; probably because it was too

well guarded. Medina is 225 miles due north of Mecca, and there is a direct pilgrims' road between the two holy places. It has been determined, however, not to build the railway over this route, but to turn southwest from Medina to the Red sea at Rabigh, follow the coast for some distance and then turn southeast to Mecca. In this way pilgrims traveling by sea from Egypt and the Soudan can reach the railway; and the latter can obtain coal and heavy supplies for the southern half of the road much more cheaply. By this route the distance from Medina to Mecca is 280 miles. This will make a line nearly 1,100 miles long, built exclusively for religious purposes, as much so as a church or a monastery. The money to build it has been obtained from Mohammedan contributions, and doubtless no such amount could have been raised in Turkey for any money-making enterprise whatever. The building of it also has drawn out qualities of persistence, endurance and self-sacrifice, which have won the admiration and respect of the few Europeans familiar with the work. The chief engineer, Meissner Pasha, is a German, but many of his staff are Turks, or at least subjects of the Turkish empire.

In the current issue there will be found the third installment of an extraordinary paper on railway valuation; extraordinary because the author has very unusual equipment and speaks with unusual knowledge of facts and conditions. Probably most of our readers will not agree entirely with his conclusions. We ourselves, at all events, do not, but we admire the skill and fairness with which the case has been presented. By a coincidence, the report of the valuation undertaken by the Railroad Commission of Minnesota appears at the same time that this other serial is running, so that we are giving more than our accustomed proportion of space to this topic in the current issue. But we feel justified in doing so, in view of the fact that physical valuation for the purpose of limiting railway rates, either directly or by implication, is surely going to be one of the landmarks in American railway history during the next few years. We rejoice frankly that the Minnesota commission has proved beyond doubt, though quite unintentionally, that rates cannot fairly be made on the basis of a physical valuation. The writer of our serial paper sees things pretty clearly, but we do not believe that he yet sees this proposition as clearly as the Minnesota commission has demonstrated it.

### MINNESOTA VALUATION OF RAILWAYS.

The Railroad Commission of Minnesota has just finished what is probably the most exhaustive physical valuation of railways ever made. The results, which are given elsewhere in this issue, are of special interest just now because of the widespread discussion of the subject of valuation. The figures are a good answer, as far as they go, to the charge that American railways, as a whole, are over-capitalized. The Minnesota Commission has meant to be fair, but it has borne the reputation—justly, we think—of being rather hostile to the railways. It certainly is not unduly friendly to them. It is, therefore, of unusual significance that its investigation shows that it would cost \$397,299,471 to reproduce, new, the nineteen carrying railways in Minnesota, or \$52,430 per mile; and, allowing for depreciation, due to wear and tear on roadway and rolling stock, that the "present value" of the properties is \$347,051,336, or \$45,799 per mile, while the Minnesota proportion of the capitalization of these 19 roads is but \$334,979,691, or \$44,206 per mile. The commission found that both the cost of reproduction and present value of 12 out of 19 carrying roads exceed their capitalization. This is the situation the *Railroad Age Gazette* repeatedly has said that any fair valuation either of the railways of a single state or of the nation would disclose.

But the commission repudiates the valuation it made based

on the actual cost of reproducing the properties. Its investigation showed that it costs an average of from 25 to 350 per cent. more to get land for railway right-of-way, yards and terminals than to get the same land for other purposes, and in its Estimate "A" it made allowance for this greater cost. It contends, however, that what the railways would have to pay to get for railway purposes the land they now own is not a fair basis for estimating its value. The fair basis, the commission says, is the "true or market value" of the land for other than railway purposes—in other words, assuming it unoccupied, what a farmer or real estate dealer would have to pay for it for farm, residence, or business purposes. The commission, therefore, makes an Estimate "B," in which it allows nothing for the extra cost of acquiring the land for railway purposes, and which, in consequence, is, for all the 25 carrying and switching roads in the state, \$37,515,054 less than its Estimate "A." Estimate "B," it contends, is the correct valuation.

The commission's position is untenable. The question is not how much it would cost to reproduce farms, or city residences or business lots, but what it would cost to reproduce land for railway purposes. The taking of land for railway use involves damage to adjacent property. A farm or a city house and lot are bought in one deal; while the purchase of land for a railway involves many deals, and land which it is known the road wants consequently goes up in price. The railway has got to pay for such incidental damages, it has got to pay the inflated price caused by its own purchases, or go without the land.

The mileage of railways in Minnesota is small compared with that in the eastern states; many more miles will have to be built to develop the state's resources. Let us see how the commission's theory would work in practice. Suppose a new company wishes to build a line, or that an existing road wishes to build a new branch. It will have to pay, say, from two to four times as much for the necessary land as the same land would cost for other purposes. If the so-called "true or market value" of the land is \$100 an acre, the railway will have to pay from \$200 to \$400 an acre. We will assume that the commission thinks 6 per cent. is a fair return on the physical valuation of a railway. On its theory, the correct valuation of the land, after it was acquired by the railways, would be \$100 per acre. But if the railway were allowed to earn only 6 per cent. on a \$100 valuation, its return on its cash investment of \$200 to \$400 would be only  $1\frac{1}{2}$  to 3 per cent. Does the commission think such a return would encourage further railway building in Minnesota?

The commission perhaps would answer that it would be only fair to let a new road earn a return on its actual investment of \$200 to \$400 an acre, but that it is not fair to let an old road, which paid much less for its land, earn a return on \$200 to \$400 an acre merely because it would cost that much to get the land now. But is not the equivalent of this done in other businesses? There are "early settlers" in Minnesota who bought their land for \$1.25 an acre. There are other farmers—just across the road, perhaps—who came to the state later and paid \$25, \$50 or \$100 per acre. Is it unfair, because the former bought their land earlier and cheaper, that they should get as much per bushel or per acre for their crops as the later arrivals and that their land should be held to be equally valuable? The commission may reply that a public service corporation has not the same right as a farmer to enjoy the benefit of the increment in value of land. But if it has not, how does the commission propose to adjust rates on old and new competing roads so as to withhold from the old roads the benefit of the increment in value of their land, and at the same time secure to the new roads a fair return upon the higher price that they pay for land? No human ingenuity can do that as long as competitive rates on old and new roads must be the same; and they must be the same as long as shippers selfishly prefer to ship by the road that makes the lowest rates.

Mr. Morgan, the engineer who had direct charge of the valuation, says in his report to the commission:

"Cost of reproduction and value as a utility have no necessary or logical relation and the fact that the terminal lands or the properties in part or in whole are not actually to be reproduced, or the fact that it might not be possible at all to reproduce them or their equivalent, probably renders their present possession invaluable, not only to the owners, but to the communities dependent upon the facilities afforded for industrial activity and commercial supremacy. It is not clear, however, that these elements, which can conveniently be made the basis for extremely high figures of value, should either merit support or find justification in an estimate purporting to represent reproduction cost."

This statement knocks the props from under the entire theory of physical valuation. The theory is that a railway should be allowed to earn only "a fair return on a fair (physical) valuation," this to be based on its cost of construction and reproduction. Mr. Morgan found it impossible to ascertain the cost of construction of the older lines in Minnesota. This condition exists everywhere. So cost of reproduction is usually the sole available basis of physical valuation. But, Mr. Morgan says, "cost of reproduction and value as a utility have no necessary relation." But if there is no necessary relation between cost of reproduction of property for railway purposes and its value as a transportation utility, what possible relation can there be between its cost of reproduction for non-railway purposes and its value as a transportation utility? And if there is no relation in either case, why waste money on "physical" valuations? For everyone, except the advocates of physical valuation of railways, recognizes that utility is the true economic basis of the value of everything that can be considered capital, and utility also has been declared by the Supreme Court of the United States to be the legal basis of the value of a railway. In the case of *C. C. C. and St. L. Railway v. Backus*, 154 U. S., p. 445, the court used this unequivocal language:

"But the value of property results from the use to which it is put and varies with the profitableness of that use, present and prospective, actual and anticipated. There is no pecuniary value outside of that which results from such use. . . . Will it be said that the taxation must be based simply on cost, when never was it held that the cost of a thing is the test of its value? Suppose there be two bridges over the Ohio, the cost of the construction of each being the same, one between Cincinnati and Newport, and another 20 miles below, and where there is nothing but a small village on either shore. The value of the one will, manifestly, be greater than that of the other, and that excess of value will spring solely from the larger use of the one than of the other."

If that is good law as defining the basis on which a railway should be valued for taxation, why is it not good law as defining the basis on which a railway should be valued for purposes of rate regulation? We wish particularly to call attention to the decision in the *Backus* case, because in discussing the legal phases of valuation most people go back no farther than the Nebraska rate case. The *Backus* case was decided only four years before the Nebraska rate case, and the decision in the latter should be read in the light of the decision in the former. Together they show as clearly as language can that the Federal Supreme Court would give exceedingly little weight to a valuation based solely on cost. It believes the basis of value is utility; and, like Mr. Morgan, it said that there is no necessary relation between utility and cost.

The theory of physical valuation of railways, in the modified form it has taken in the hands of the Minnesota commission, as well as in its usual form, is based upon economic fallacies. The first fallacy is that the value of a railway is the sum of the values of its parts; as the Supreme Court says, "there is no pecuniary value outside of that which results from use." The second fallacy is that rates should be based on cost of service, or the value of the instrumentality that does the work done; whereas, the main proper basis is the value of the work done—the basis on which are fixed the charges for the services of lawyer, surgeon, maidservant and cook. The time will come when every intelligent economist, statesman and jurist will see that physical valuation of railways for purposes of rate regu-



lation is as arrant economic moonshine as greenbackism or free silverism.

#### PROPOSED WORKMEN'S COMPENSATION LAW IN NEW YORK.

Elsewhere in this issue is given the substance of a bill which has been introduced in the legislature of the state of New York relating to compensation to workmen for accidental injuries suffered in the course of their employment. Its provisions are of interest for several reasons. The bill may be taken as representative of the views of organized labor; it is founded upon and follows closely the provisions of the English law which went into effect on July 1, 1907, and which has made it necessary for every English employer of labor of whatever description to take out as many policies of insurance as he has employees and one over for emergency, such as a temporary service; and it provides two chances of recovery of damages, one for a smaller amount based upon the amount of the workman's wages and available in case his original action for a larger amount—a lump sum—fails.

Attention may be called briefly to the latter feature, which is covered by section 3 of article II. In case of death resulting from injury, a workman's dependents, according to the provisions of the proposed law, are entitled to recover an amount equal to his earnings in the same employment during the three years preceding the injury, but not to exceed \$1,500. If totally or partially incapacitated for work as a result of the injury, he is entitled to recover an amount represented by 50 per cent. of his average weekly earnings during the previous twelve months, payable in weekly instalments during incapacity, but such weekly payments are not to exceed \$10 nor aggregate a greater amount than \$1,500.

But if, instead of availing himself of the provisions of this act, the workman or his representative shall choose to bring an action independently thereof, as under the common law, for instance, and fails to recover in such action, the action may be dismissed and a second suit brought under the terms of this act. In other words, if a suit is brought originally for, say, \$5,000 or more for the death of a workman, and it is determined that the injury is one for which the employer is not liable in such action, then a second action may be brought for an amount calculated as above stated, and not in excess of \$1,500. Under this act the only exception to the liability of the employer is "the serious and wilful misconduct or serious neglect" of the workman.

In view of the fact that the bill in question is based upon the English law, and of the further fact that, if passed, there is a reasonable expectancy that its terms will be interpreted somewhat in accordance with the interpretation of the English courts upon similar points, it is perhaps worth while to consider a few of the views that have already been expressed in England in relation thereto. The definition of "workman" in the bill as presented is not so minute as in the English act, but seems to be sufficiently comprehensive, as it is taken to include "every person who is engaged in an employment, whether by way of manual labor or otherwise, and whether his agreement is one of service, apprenticeship or otherwise, and is expressed, or implied, is oral or in writing." In England the same term is taken to mean—in addition to those ordinarily understood to be included in the term—all classes of domestic servants, barkeepers, clerks, commercial travelers, companions, governesses, nurses, farm employees, porters, school teachers, typewriters, etc. The term also includes occasional workmen if employed at fairly regular intervals, either privately or for the purposes of trade or business—as window cleaners, scrub-women, etc. In fact, the term seems to include everyone who performs any kind of service for another at a yearly rate of wages not in excess of £250 (\$1,250) per year. There appears to be no limitation in the present bill which would exclude any of the classes of labor mentioned.

As to what constitutes an accident, and the determination

of whether an injury was received in the course of the workman's employment, there are several interesting decisions. The contraction of the disease anthrax, from sorting and handling hides, wool, etc., was, in the case of *Brintons v. Turvey*, decided to be an accident within the meaning of the act of 1897, which is far less favorable to labor than the present. The county court judge found that the disease was caused "by the accidental lighting of a bacillus on a part of the deceased's person, which afforded it a harbor in which it would grow and multiply, and so cause a malignant disease and consequent death." The principal English commentator upon this act infers that the contraction of any infectious or contagious disease, in connection with most of which bacilli or germs have been identified, if it arose out of and in the course of employment, would be an "accident." In fact, the law specifies six classes of disease and the kinds of employment in which they seem likely to arise, and it appears to be inferred that their existence is *prima facie* evidence that they arose from such employment.

An engineman was injured by the glass from the broken window of his engine, which had been struck by a stone thrown by a boy. It was held that this was an accident that arose out of his employment, and his employer was therefore liable (*Smith v. Lancashire & Yorkshire Railway Company*). A similar view was taken in the case of a bricklayer who was struck by lightning and fell while working on a scaffold 23 ft. from the ground (*Andrew v. Fallsworth Industrial Society*). In the case of a carpenter working for one day, and who ate his lunch at noon in the barn where he was working and was bitten by a pet cat belonging to his employer, with the result that blood-poisoning set in, his employer was saved from the payment of damages only by the showing that the carpenter had teased the cat to the detriment of its dignity and the loss of its temper. A man standing by a hatchway, and being taken with a fit, fell into the hatchway. It was decided that the injury was caused by the hatchway and not by the fit, and therefore arose out of his employment. A man employed in a shop, and who injured his hand in trying to replace a belt upon a machine, though it was no part of his business to do so, was decided to be entitled to recover damages from the owner of the shop, on the ground that he was endeavoring to do the latter a service. In *Holmes v. Great Northern Railway* a workman had been directed to go to work at a place four miles down the line from King's Cross station, and traveled from that station in one of the company's trains. In an action for damages for an injury received it was decided that his employment began at King's Cross. A man who quit work at 6 o'clock in the morning, but was killed at noon in crossing the tracks to get his pay, was decided to have been injured in the course of his employment, although the train was not owned or operated by his employer. (*Lowey v. Sheffield Coal Co.*)

These various cases are cited briefly, not for the purpose of calling attention to any vagaries of the interpretation of English law, but for the purpose of directing attention to the law itself, inasmuch as it is the prototype of one which may be in force in the state of New York after January 1, 1910. Under the English law as it stands it is difficult in most cases to see how any other kind of decisions could have been rendered. There is no reason to suppose that any more substantial justice would be rendered in this country under a similar law.

Favorable as the bill in question appears to be to the workman, however, its enactment would work less of benefit to the honest claimant or his representative than certain plans that have been adopted by some industrial concerns of their own volition. A notable instance in this category is the New York Edison Company, whose plan has been described in a paper prepared by one of its officers. The plan need not be described here, but it is sufficient to say that the company does not limit its benefits to \$1,500, that it takes ample care

of its injured employees and their dependents, and that the results, so far as the employees themselves are concerned, have been so satisfactory as to result in the practical elimination of damage suits. Out of over 3,000 cases, the company has had only seven suits, and six of these were determined in the company's favor. It seems to require only a certain degree of confidence to be established between employer and employee to afford more satisfactory results than can be secured by the most stringent legal enactment. Whether railways can be brought to the point of seeing that it is better that a liberal treatment of injured employees and of the dependents of those who may have lost their lives in the course of their employment shall originate voluntarily with themselves than under the compulsion of drastic laws, is a question we hesitate to try to answer.

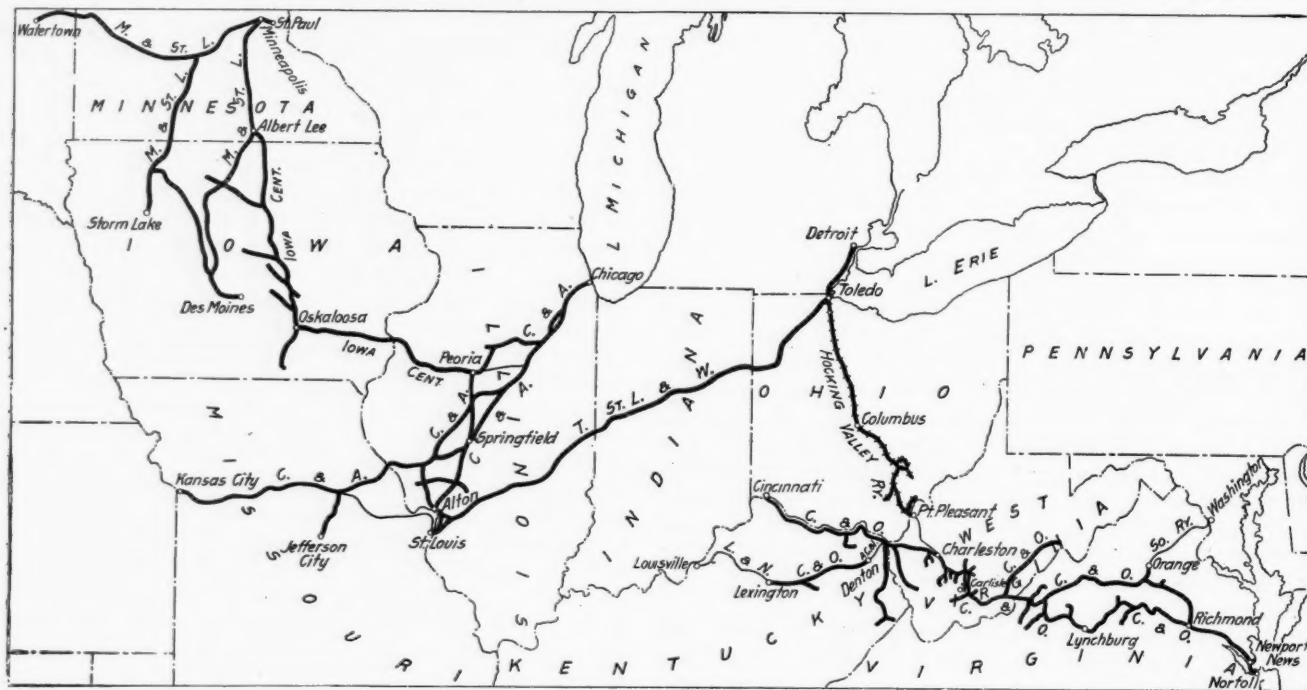
#### THE CHESAPEAKE & OHIO PLACE IN THE HAWLEY SYSTEM.

The sale of the Colorado & Southern and the purchase of the Chesapeake & Ohio within a couple of months has not apparently been a step in the direction of making the roads controlled by the Hawley interests a more homogeneous sys-

roads. The Hocking Valley runs from Toledo south as far as Point Pleasant on the Ohio river, and freight could be routed over the Kanawha & Michigan, from there to Charleston, W. Va., on the C. & O., 56 miles south of Point Pleasant. To route freight over the Hawley lines to Toledo, then south over the H. V. to the C. & O. would be rather fanciful.

The Clover Leaf-Alton system hauls large quantities of coal from fields in southern Indiana to Chicago, or turns this traffic over to the Iowa Central for final destinations in Iowa, Wisconsin or South Dakota, but the Alton is not a soft coal road, of course, in the sense that the Chesapeake & Ohio is. There would be no object in shipping coal from West Virginia fields westward.

The recent financial management of the Chicago & Alton has left it with heavy interest obligations, but the road physically is in first-class shape. It conducts an admirable passenger service from Chicago to St. Louis and Kansas City, and its earning power is shown by slightly over 2½ per cent. earned on its common stock in the exceptionally bad year ended June 30, 1908. The Toledo, St. Louis & Western, which owns a majority of the stock of the Chicago & Alton, having bought this stock from the Rock Island in 1907, paid 4 per cent. divi-



The Hawley Roads and the Hocking Valley.

The Hocking Valley, in which the Chesapeake & Ohio has an interest, shown cross hatched.

tem. Previous to the sale of the Colorado & Southern the Hawley roads were the Toledo, St. Louis & Western; the Chicago & Alton; the Minneapolis & St. Louis; the Iowa Central, and, away off in Colorado and Texas, the Colorado & Southern and its controlled and leased lines. The two recent deals have resulted in the loss of the Colorado & Southern and the gain of the Chesapeake & Ohio, but there is no physical connection between this road and the others in the system, and a glance at the map shows that there is a strip of territory, about as wide as the distance between Toledo and Cincinnati, slanting southwesterly to the Gulf, that is nowhere spanned by a Hawley road.

The Clover Leaf-Alton, Iowa Central, and Minneapolis & St. Louis group of roads do form a system over which it is possible to route freight so as to get a haul all the way from points in northern South Dakota east as far as Lake Erie; but the route is not a direct one and the territory traversed is highly competitive.

The Chesapeake & Ohio owns a sixth interest in the Hocking Valley, shown cross-hatched on the map with the Hawley

roads. The Hocking Valley runs from Toledo south as far as Point Pleasant on the Ohio river, and freight could be routed over the Kanawha & Michigan, from there to Charleston, W. Va., on the C. & O., 56 miles south of Point Pleasant. To route freight over the Hawley lines to Toledo, then south over the H. V. to the C. & O. would be rather fanciful.

The Colorado & Southern was acquired by the Hawley interests when it was in a bad way. The business of the road was developed, the lines extended and large sums spent for betterment, and the affairs of the company steadily bettered from a state of receivership, until last year the Colorado & Southern paid 4 per cent. dividends on both first and second preferred stock; it was then sold.

The Chesapeake & Ohio has been a conservatively managed, first-class soft coaler, paying 1 per cent. dividends on its \$62,799,100 stock, the rate being the same since 1899. Large sums have been put back into the property for improvements that might well have been charged to capital account, and this policy has so enhanced the value of the property itself that, taking into account its geographical position, it appears likely that the acquisition of the C. & O. was rather an investment of funds received from the sale of the Colorado & Southern than an extension and enlargement of the Hawley system.



There may be a hint of the future policy of the company in a circular announcing the meeting of stockholders for February 9 to act on the proposed issue of \$30,000,000 bonds, in which G. W. Stevens, President, says that the result of the success of the plan to issue bonds will mean that "the company will be able to distribute to stockholders a more satisfactory share of its future surplus earnings."

## Letters to the Editor.

### RAILWAYS AND POLITICS.

104 Girard street, Winnipeg, Man., January 20, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

An editorial in to-day's *Saturday Evening Post* says: "In New England and the West, especially, the roads still meddle with politics. Wherever they touch politics the touch leaves a rotten spot."

And when politics touches the railways? Again—"On the whole, the experiment of socializing the railways by Government regulation (or civilizing them, if the other word shocks any overtender sensibilities) is working encouragingly." In Texas, for example.

A. C. L.

### THE STATE COMMISSIONS.

Denver, Colo., January 21, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

Referring to your issue of January 15th, in an article entitled, "The State Railway Commissioners," you failed to do justice to the retiring board of commissioners of the state of Colorado, composed of F. J. Chamberlin, H. L. Ritter and Bulkeley Wells, in that you failed to state that they employed as clerk a man of fifteen years' experience in all branches of the traffic department. Politics played no part in the selection of the man for this position, except that the commission took the position that they desired to select a man of railway experience and not a politician and their wishes prevailed over the solicitations of numerous politicians and I was made clerk. My experience was gained with the Southern Railway. My connection with the commission terminated when the new commission came into office on the 12th inst.

E. O. ALSTON.

### OCEAN STEAMSHIPS VS. TRAINS DE LUXE.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

The progress in methods of transportation in the last quarter century is most unequal. New York's efficient underground trolley service, subway and river tunnels have not obliterated the belated horse car, long since eliminated from the streets of minor cities. The Harlem river is still encumbered with swinging bridges and their obstructive center piers, a type rapidly being supplanted by lift bridges in the Chicago river. The magnificent new railway stations of Washington and New York find no counterpart in Pittsburgh or Chicago; American steamship piers do not yet approach those of Europe; but the general progress in transatlantic service has rapidly outstripped the improvements in transcontinental service. One may take a luxuriously furnished boat in New York for almost any port in Europe, but one cannot secure anything better than a second-class tourist car to cross that continent. No first-class ticket from New York to San Francisco can obviate the necessity of changing cars in a congested station, although the traveler may otherwise fare sumptuously from London to Yokohama.

The accidental character of some improvements is unfortunate but comprehensible. Yet how shall we explain the vast superiority of the best ocean service to the best railway

service of to-day? The eighteen-hour trains de luxe of the New York Central or Pennsylvania lines, the pride of American railway engineers, will not stand comparison with the best transatlantic steamships, measured by the progress of twenty years. There is not in use any improvement in the railway terminals in New York or Chicago comparable to the transformation of the docks in New York, Southampton, Liverpool, Plymouth, Antwerp, Bremen or Hamburg. The New York stations will shortly rival the docks, but the Chicago terminal of the Pennsylvania system is worse than it was twenty years ago.

Railway roadbed, signals and rolling stock have improved enormously in twenty years, but not at the pace set by the steamship companies. Grade crossings still abound; the air brakes, now in use even on freight trains, are so inadequate that a heavy freight car may double up on a light one in the path of the eighteen-hour train at any time; block signals are by no means perfected; oil, substituted for coal on the Pacific coast, is still unappreciated in the eastern states; electricity is used only in the New York terminal. On the other hand, the steamships have promptly employed turbine engines and wireless telegraphy, with an acceleration of speed and an added safety which make the railway improvements look primitive. In appointments for the convenience of passengers the railways may boast of vestibules, electric lights and fans, steam heat, stenographer, barber and manicurist, all of which find their counterpart on the ocean liners. Wireless telegraphy, however, has not been employed, and should that be excused on the ground of imperfection, the railways cannot claim to have experimented as the steamship companies have. Meanwhile the telephone, which would seem to be more available on land, is more used at sea.

The great deficiencies in the railway service, however, are in those fundamental conveniences which represent superior intelligence and no unreasonable expenditure. The compartment cars offer comforts beyond the old sleeping cars, but they still include that abomination of the old sleeping car: upper berths; and the size of the berths is still unpardonable small. The railways cannot excuse themselves on the ground that there is no room for such suites, with beds and bathroom, as one finds on the best ocean steamships, for at least one American railway company justifies its advertisement of berths longer, wider and higher than others. No gain in speed can compensate for the retention of the upper berth, the small lower berth, or the insufficient toilet accommodations for women. A sleeping car on either eighteen-hour train, which has all the berths occupied—a not unusual occurrence—has no hygienic advantage over the steerage of the best Atlantic vessels. It is unhealthful and indecent to crowd people into the space provided in the "best train in the world." While the success of one railway in enlarging these facilities is ignored; while such an early advance as the Mann boudoir car has established no precedent, and the steamship staterooms remain unrivaled, the railways must speak more modestly of their accomplishments.

Other services on the trains are similarly deficient. The contemporary dining car is a marvelous multum in parvo, but often a train needs two diners, which are seldom supplied. Besides, even with the introduction of the a la carte service, the hours of the boarding house instead of the European hotel are retained. Baedeker refuses to "star" any American hotel which does not serve meals at all hours. Similar discrimination should be made against the eighteen-hour train. The great ocean liners have grill rooms where meals can be served at any time. Even where this provision is not made, and always in addition to it, afternoon tea is served free, and a night luncheon is available. It would not overtax the limited space of these "limited" trains to have a small buffet from which tea balls, in addition to the highly remunerative high balls, might be provided. It could also be made easier to furnish service to the cars at all hours instead of regular meals in

the dining car, a standard approached even in the day coaches of the Empire State express and some western trains. If mechanical improvements are necessary for this, then some of the steamship engineers might be employed to furnish the initiative.

May it be that the eighteen-hour train is a business man's train where speed is more important than comfort, the type-writer paramount to the bed; where if stock quotations be furnished hourly, train despatchers' messages may be adequately transmitted by the primitive Morse telegraphy, which has witnessed no improvement in a generation? Is it possible that the subsidies given to the European steamship lines enable them to rise above commercial competition in their experiments? Do European standards of comfort dictate the transoceanic advances, or the needs of European stockholders limit the possible expenditure on American railways? Or is it simply because, as usual, we have not thought of employing the comparative, scientific method of securing the best attainable regardless of provincial prejudices or economic egotism?

CHARLES ZUEBLIN.

[Mr. Zueblin was until recently Professor of Sociology in the University of Chicago. He is now engaged in social settlement work in Boston. In a recent lecture in Chicago he said that the best modern railway equipment is far behind modern ocean steamships in the matter of improvements. We asked him to write out his views on the subject, which he has done in the accompanying article. Warren J. Lynch, Passenger Traffic Manager New York Central Lines, at our request, has written a reply. Mr. Zueblin's letter does not call for a very serious answer, however. The development of ocean line traffic has been furthered by the fact that the permanent way is broad, and that it does not cost anything to maintain it between terminals. It has been demonstrated that economy in working is more or less proportionate to the size of the ship, always providing that there is enough regular traffic so that the ship will not run empty; consequently, in the absence of special features to limit the size of the hull, it has been found profitable to make ships bigger and bigger, and they have grown in 65 years from the 230 ft. and 1,150 tons of the first Cunarders to the 850 ft. and 44,000 tons of the new White Star boats now building. The parts of a modern ship that pay the chief operating costs lie beneath the feet of the cabin passengers. Freight and steorage traffic do not need the top decks, and in a ship the size of the Baltic these decks offer some 50,000 sq. ft. of available space which can be dedicated to the comfort and luxury of the cabin passengers without appreciably detracting from the earning power of the rest of the ship at all. It is possible to arrange this enormous area in handsome, airy prospects, which would not be the case if it were extended to fill the approximately equal floor space of a train of 80 Pullman cars.

To sum up, the steamship has more space available for its first-cabin passengers than it can use, and yet can make a profitable voyage with this space empty, when freight and steorage traffic are on the basis they were in 1906 and 1907. The railway cars must needs deal in inches where the steamships deal in yards, and yet high-class long-distance rail traffic is a little cheaper than high-class long-distance steamer traffic—public impression to the contrary. An interesting table may be constructed as follows:

Table of Fares, Moderate Speed Services.

	Miles.	Fare.	Meals.	Half-stateroom.	Tips.
New York to Chicago .....	1,000	\$20	\$3	\$7	\$1
New York to Liverpool .....	3,000		\$125		\$8

Assume fare at 2c. a mile and meals at \$1 each; then the following table can be constructed:

	Miles.	Fare.	Meals.	Half-stateroom.	Tips.
New York to Chicago .....	1,000	\$20	\$3	\$7	\$1
New York to Liverpool .....	3,000	60	24	33	8

That is to say: stateroom accommodation from New York

to Chicago costs 7 mills per mile; from New York to Liverpool, 1.1 cents per mile. The total cost per trip works out at 3.1 cents per mile by rail and at 4.1 cents per mile by water. To compare with the rail stateroom, an outside stateroom on a high class steamer of moderate speed is assumed.—EDITOR.]

#### OCEAN STEAMSHIPS VS. TRAINS DE LUXE—A REPLY.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

Mr. Zueblin's article is unfair to the railways for the fundamental reason that it is a comparison of two things that are essentially unlike because they must be built and operated under essentially dissimilar conditions and limitations. He errs in assuming that the difference between the accommodations furnished a passenger by land and a passenger by sea is due to the difference in the abilities of the designers of the two methods of transportation, viz., the railway car and the steamship. One might as well contrast Wilbur Wright's aeroplane with Count Zeppelin's airship and claim superiority of inventive genius and constructive ability for Count Zeppelin, because his machine affords the passenger a greater degree of comfort and convenience than is afforded by the machine produced by the American inventor. Wilbur Wright's machine represents the highest development of the heavier-than-air flying machine; Count Zeppelin's airship represents the highest development of the lighter-than-air machine. In the same way the Mauretania represents the highest development of water transportation, just as the Twentieth Century Limited and the New York Central Railroad, in my judgment, represent the highest development of land transportation.

Mr. Zueblin alludes to the fact that the horse-car is still found on cross-town street railway lines in New York City. I hold no brief for the street railways of New York, just as I hold no brief against the ocean steamships; no one admires more the genius that has been shown in the development of the magnificent modern Atlantic liner. But since the presence of horse cars in New York has been mentioned as an instance of the backward development of land transportation, it seems only fair to say that one of the reasons why the cross-town lines on Manhattan have not been electrified is the great expense of installing an electric system which would haul passengers but a short distance, Manhattan island being but 2 miles wide, and which would of necessity cross so many other electric systems. There has been no satisfactory, self-sustained power developed as yet for lines where there would be interference with so many crossing lines. The line on the water front in New York has not been electrified because the city will not allow an overhead wire in that section and the transportation company fears that an underground electric current would be greatly interfered with by the water conditions.

Mr. Zueblin says the magnificent railway stations in New York and Washington have no counterpart in Pittsburgh or Chicago. As a matter of fact, Pittsburgh has as fine railway stations as any city of its size in the United States, or the world. The union station of the Pennsylvania system there is a splendid structure. The station of the Pittsburgh & Lake Erie is a model. The Wabash has a beautiful terminal there. Is it possible Prof. Zueblin made the statement referred to without ever having seen the stations at Pittsburgh? As for Chicago, the Rock Island and Lake Shore have in the La Salle street depot one of the finest and most modern stations ever constructed, and the Chicago & North Western is spending \$20,000,000 in erecting a passenger depot that will be one of the finest used by a single railway in the world.

It is asserted that "American steamship piers do not yet approach those of Europe." As a matter of fact the new terminal piers of the North German Lloyd in Hoboken, N. J., are perhaps the finest in the world. It is hardly possible fairly to compare them with the steamship piers in Europe, because most of the harbors in Europe are closed tidal docks,



as, for instance, those of Liverpool, London, Southampton, Havre, Hamburg, Bremen, etc. Conditions in New York are very different from those in Northern Europe, as, owing to the configuration of the New York harbor and the slight difference between high and low water, it is possible and necessary at New York to dock steamers at piers built out into the stream. The North German Lloyd piers in Hoboken are as fireproof as such structures can be made. The substructure consists of piles driven 70 to 90 ft. in the mud, on which is laid a concrete deck pier, the superstructure which consists entirely of steel being rendered fireproof by jackets of concrete. It would be impossible to construct piers in the New York harbor on anything but pile substructures because the silt or mud in the harbor is too deep for stone construction. Aside from these technical details the docks at Hoboken are extremely beautiful from an artistic point of view.

It is complained that one cannot secure anything better than a second-class tourist car across the American continent. As a matter of fact, one cannot secure even a second-class tourist car across the continent because all cars stop at Chicago. (Except on the C. P. R.—Editor.) This is made necessary by considerations of cleanliness and sanitation. It would be impossible to run a car with passengers from New York to San Francisco without its getting into a more or less unclean and unsanitary condition. Cars are kept as clean as possible from New York to Chicago, and there the passenger takes another clean car to San Francisco.

What have Mr. Zueblin's references to roadbed and signals to do with ocean steamships? The railways of the United States have in use every improved signal device that has been proved practicable, and, as past experience shows, any inventor who will produce a better signal than those now in use can speedily get it adopted. Furthermore, the signaling devices of the railways are installed and maintained at their own expense, whereas the various governments of the world build and maintain lighthouses for the protection of steamships.

It is complained that sleeping cars still include upper berths. They only include upper berths when the passenger does not pay for an entire section. The passenger can only get a whole room on a ship when he pays for it, and he can get a whole room on a sleeper when he pays for it. If the railways should take out all upper berths and make each passenger pay for an entire section they would be apt to receive very severe criticism. The size of berths and rooms on trains is small, but this is necessarily true owing to the limitations imposed by the size of the car. The standard gage of a railway track is 4 ft. 8½ in. The gage once fixed, cuts once made, tunnels once built, limitations are imposed upon the car designer which he cannot escape. The problem then is simply to make what space there is in the car most comfortable for passengers. The marine designer on the other hand is governed by no limitations of length, breadth or depth, except the minimum depth of the harbors to which the ship is to go. As soon as steamship companies evinced a desire to build ships of greater draught than existing harbors would admit, all the wealth and power of all the governments of the world were set to work to deepen and widen harbors. No part of the expense of this work had to be met by the private capital operating the steamship companies. Suppose one of the great railway companies should desire to operate passenger cars of twice the size and convenience and having twice the air space of any existing cars. Would the government come forward and provide a roadway with the curvature, tunnels and terminals necessary to handle such cars?

It is complained that the dining service on "trains de luxe" is inferior in some ways to that on steamships. The statement is true only to a limited extent. But travelers on trains are not on them as long as travelers are on ocean steamships, and therefore their requirements in this respect are much less. As a matter of fact, however, there are many American

trains making long runs on which meals can be got at all hours. There is hardly a railway handling through passenger business in this country which does not have on its principal trains buffet cars, in which a passenger can get food and drink any time he wishes it.

I would not be understood as implying that the railways furnish better passenger service in their field than the ocean steamships furnish in their field. The ocean passenger vessel is one of the greatest transportation developments of modern times and is entitled to all the praise that Prof. Zueblin or anyone else can give it. But I do not believe that anyone who is thoroughly familiar with the different conditions under which American passenger trains and ocean steamships have been developed and the different conditions under which they are operated, will assert that the development of railway passenger service in the past 20 years has been less remarkable than the development of ocean passenger service, or that the railways do not give to all classes of passengers as good service in proportion to the physical limitations under which they labor and to the charges for and the cost of rendering the service, as do the ocean steamship companies.

WARREN J. LYNCH,

Passenger Traffic Manager, New York Central Lines West of Buffalo.

## Contributed Papers.

### CENTRAL OF NEW JERSEY BRIDGE RENEWAL AT BETHLEHEM.

Near the point where two lines of the Central of New Jersey meet at Bethlehem Junction, Pa., the former bridge over the Lehigh river has been replaced recently with one designed to correspond more closely in capacity with the great increase in weight of motive power and rolling stock and the growing volume of traffic. There are three 146-ft. spans, resting on piers and abutments of stone masonry. The masonry was found to be in good condition, and has not been rebuilt, except for some slight changes required by the new superstructure, which formerly consisted of three single-track through pin spans and which have been replaced by the same number of single-track through riveted spans.

The general situation of the bridge is shown by the location plan and by the photographs of the old and new structures. At the point of crossing, the direction of the line is a little north of northwest. On each side of the crossing, it is nearly east and west, the bridge being interposed as a tangent between the two parts of a reverse curve. On the south side, directly on the bank of the river, there are buildings, and the Lehigh Valley Railroad is crossed; on the north side, between the river and the point of junction of the two lines, are a road and a canal with its towpath. The space for storage ground was thus extremely limited and not conveniently situated. Space was selected at the north end of the bridge and in the narrow space between the river and the canal. Notwithstanding the additional difficulty imposed by the nature of the location, there were no delays to traffic, except that one train during a period of a few days was sent around the site by another line. About four months were occupied in the work of removal of the old spans and the erection of the new.

The tops of the stone masonry piers and abutments are capped with a grillage of 10-in. I-beams, filled in with concrete, on which rest the cast-steel shoes of the fixed, and the rollers of the movable, ends of the spans. The skew is 9 ft. The requirements for erection specified that two spans must be trestled up complete and the existing trusses removed so that the railway company could make the necessary alterations to the masonry.

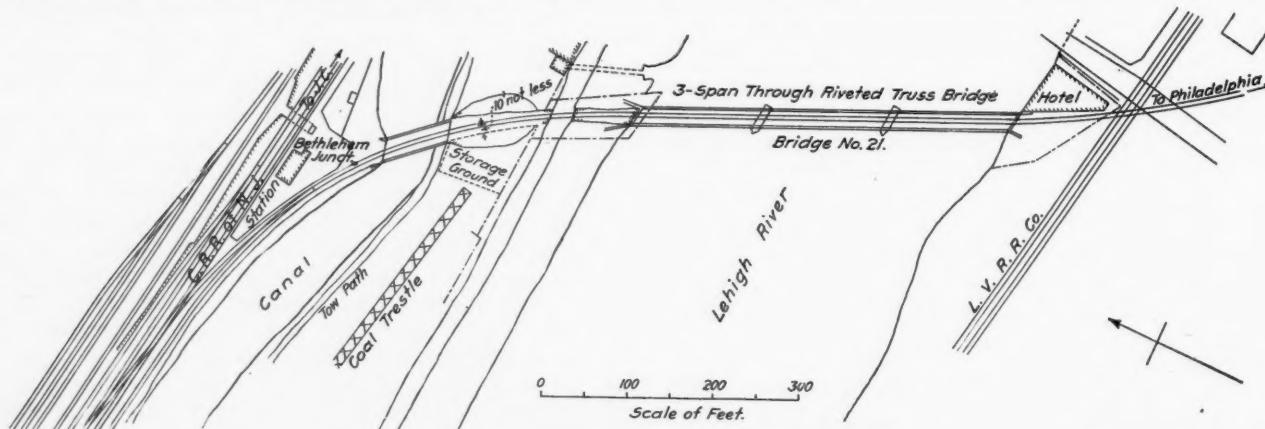
The order of erection was as follows: (1) Erection of traveler and false work. (2) Removal of the old floor and placing

of the new stringers on the false work to carry traffic. (3) Blocking up and removing the old trusses. (4) Placing the floor beams and advancing the new stringers into their final position. (5) Erection of the new trusses.

The false work of each span consisted of a series of six bents spaced about 19 ft. 10 in. apart between centers of up-rights, each of the three pairs being tied together by diagonals.

and that of the new, 30 ft. center to center of chords. The spacing of the old trusses from center line of truss to center line of track was 8 ft., and of the new, 8 ft. 2½ in.

After the removal of the old floor, the new stringers were laid on the false work to carry traffic, but, as required by the change of structure, a little distance, out of the final position to which they were afterwards advanced just before the erec-



Location of Lehigh River Bridge; Central of New Jersey.

There were also two bents placed in skew against the abutments. Each bent was made up of eight 10 x 12-in. uprights about 25 ft. long, supported on a 12 x 12-in. mudsill—the river bottom being hard sand—and joined at the top by a 12 x 14-in. cap supporting 10 x 12-in. stringers carrying 12 x 12-in. blocking under the stringers of the old span. On these bents the traveler was erected, the legs being spaced 21 ft. center to center. The height of the old trusses was 24 ft. center to center of chords,

and that of the new, 30 ft. center to center of chords. The spacing of the old trusses from center line of truss to center line of track was 8 ft., and of the new, 8 ft. 2½ in.

After the removal of the old floor, the new stringers were laid on the false work to carry traffic, but, as required by the change of structure, a little distance, out of the final position to which they were afterwards advanced just before the erec-

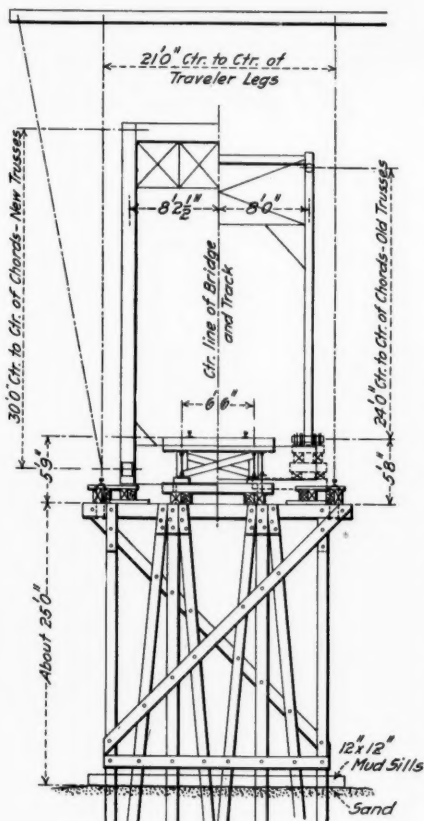


Old Lehigh River Bridge.





New Lehigh River Bridge; Central of New Jersey.

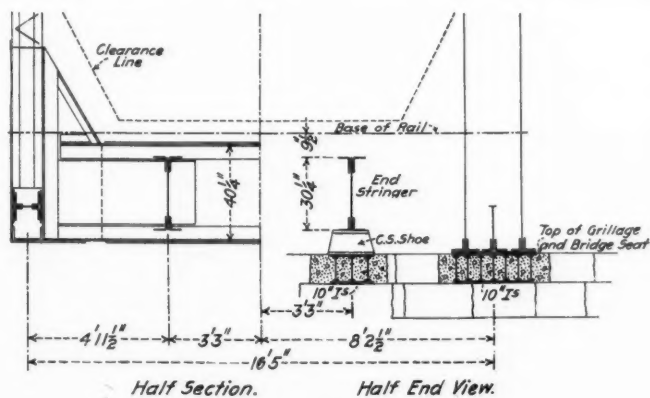


End Elevation of Falsework.

plates, with 6 x 6 x 1-in. angles; the other stringers are the same, except that the angles are only  $\frac{3}{4}$ -in. thick. The floor beams are made of 40 in. x 9/16-in. plates, 6 in. x 6 in. x 9/16-in. angles, and 13 in. x 9/16-in. cover plates. The bottom chord of the middle section is made continuous for a length of 72 ft. 9 in.; it is a built-up H-beam, and the angles and side plates are each in one piece of this length. The angles are 6 x 4 x  $\frac{3}{4}$  in., weighing 25.4 lbs. per foot, and the side plates are 14 x 9/16 in. The thickness of the made-up chord section is  $13\frac{1}{4}$  in. back to back of angles. Lacing bars are 3 x  $\frac{3}{8}$  in.

The vertical members of the truss are made up each of two 15 in. channels, 33 lbs. per foot, web  $13\frac{1}{32}$ -in. thick and with 3  $13\frac{1}{32}$  flanges. The middle section of the top chord is composed of two web plates 20 x  $\frac{1}{2}$  in., cover plate 24 x  $\frac{1}{2}$  in., upper angles  $3\frac{1}{2}$  x  $3\frac{1}{2}$  in. and lower angles 5 x  $3\frac{1}{2}$  in. The side plates are spaced  $15\frac{1}{2}$  in. between webs. The length of plates and angles is 40 ft.

The diagonals are made up of angles and lacing, the angles



Detail of Bridge Seat.

being 6 x  $3\frac{1}{2}$  x 9/16, and weighing 17.3 lbs. per foot, or 6 x  $3\frac{1}{2}$  x  $\frac{1}{2}$ , weighing 15.4 lbs. per foot, according to position in the truss.

In the end section of the trusses similar features of design are carried out, with the changes required by the difference in position. The end posts are made up of two 20 x  $\frac{1}{2}$ -in. web plates, two  $12\frac{1}{2}$  x  $\frac{3}{4}$ -in. side plates, cover plate 24 x  $\frac{1}{2}$  in.,

and  $3\frac{1}{2}$  x  $3\frac{1}{2}$ -in. and  $5\frac{1}{2}$  x  $3\frac{1}{2}$ -in. angles, etc. The end pins are  $6\frac{11}{16}$  in. in diameter.

Work was completed and the bridge put in service in August, 1908. The steel was fabricated and erected by the Phoenix Bridge Co., Phoenixville, Pa., under the direction of the engineering department of the Central of New Jersey, Joseph O. Osgood, Chief Engineer, and J. J. Yates, Bridge Engineer. A. B. Milliken, of the bridge company, was Superintendent of Erection.

#### ELECTRIFICATION OF MELBOURNE SUBURBAN LINES.\*

BY CHARLES H. MERZ, M.INST.C.E.

##### XII.

In considering the question of the most suitable type of rolling stock for a large, important and rapid suburban service, the two chief considerations are: Firstly, to secure the maximum passenger accommodation for a given weight of coach; this is particularly important with electrical operation because the amount of electrical energy used in driving the trains increases in almost direct proportion to the weight. Secondly, to adopt a design which will enable the passengers to enter and leave the trains at the different stations as rapidly as possible, thus reducing the time spent in stops to a minimum and thereby increasing the schedule speed. As would be expected, the first of these considerations is best met by making each coach as large as possible, that is, as long and as wide as possible. The length and width of coach are, in practice, limited, not by difficulties of construction, but by the fact that the dimensions have to be kept within such limits that the coaches do not foul platforms or other trains on adjacent tracks when rounding curves. The second consideration is almost entirely one of arrangement of seats and doors.

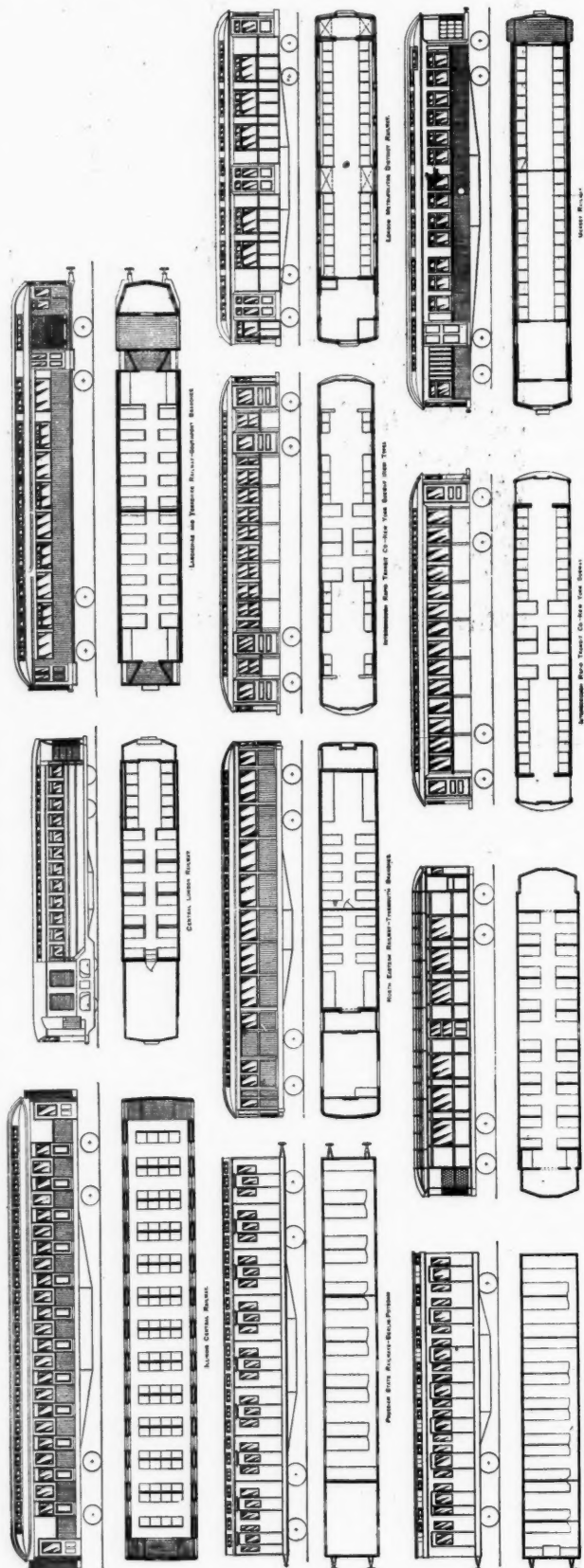
The types of stock generally in use may be classified under two general heads: Corridor stock with doors at each end, and cross-compartment stock with side doors. The general outline and seating capacity of different designs in use for suburban traffic are illustrated herewith. Whereas end-door stock is usual in America to the almost entire exclusion of side-door stock, the reverse holds good on the continent of Europe. For main-line and high-speed working, corridor stock has great advantages; the design may be made rigid and strong and the side framing, being without openings or breaks for doors, can be built in a form of a continuous girder. The corridor also admits of communication throughout the length of the train, a requirement of all modern main-line stock, and the doors at the ends being arranged to open inwards the coaches can be built of maximum width, i.e., with minimum clearance between passing trains.

In America, and to a certain extent in England, the corridor type of coach has also been developed for suburban working. For tube, subway or underground railways dealing with very heavy traffic, it has undoubted advantages, if trainmen are stationed at each end of every coach to open and shut the doors and to hurry up passengers in entering and leaving cars at stations, and if it be a question rather of coping with the traffic than of operating at minimum cost. It is not necessary to delay the starting of the trains to shut the doors, an important matter with high acceleration, and passengers do not waste time walking up and down the platforms looking for seats as they do where there are separate compartments and, further, this design provides for a maximum of standing room, which for short journey traffic is a valuable feature.

On the other hand, for ordinary suburban working the expense of so many train attendants is prohibitive and without them there is delay in discharging and loading trains where all

passengers have to leave by comparatively small end doors. The importance of providing ample door area may be judged from the fact that on some lines where corridor stock is in use, additional doors in the ends and also in the centre of the coaches have been proposed and in some cases adopted.

While such a coach may be best suited to the special conditions of tube and subway working where there are very frequent stations and where, in consequence, very high accelerations and short time stops have to be adopted to maintain a



Types of Rolling Stock Used on Electrically Operated Railways.

\*Abstract from the Report to the Victorian Railways Commissioners on the application of Electric Traction to the Melbourne Suburban Railway System. Published by the courtesy of the commissioners.



good schedule speed, I do not think that the extra expense of the train crews involved would be justified, or that a type of coach, the chief merit of which is large standing space, is the best suited to the conditions on the Melbourne Suburban system on which many people have daily to travel considerable distances.

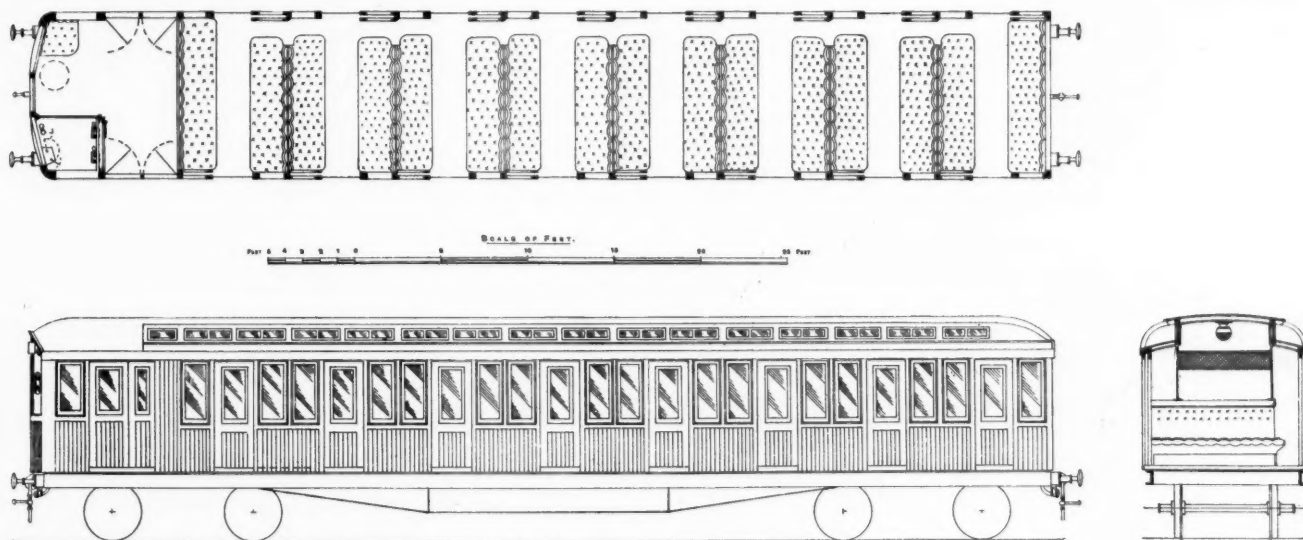
The illustration shows that, although with the corridor type of coach there is a large amount of standing room, the seats provided for the same length of coach are considerably less than in the case of the compartment coaches; corridor stock, on the other hand, provides facilities for changing from one compartment to another in a crowded coach even after the train has started, and this is an advantage not lightly to be sacrificed. If, therefore, it were a question of building new stock, I consider the proposed type shown herewith, originally suggested by your chairman and designed by the chief mechanical engineer while I was in Melbourne, would be the

suitability for continually adding to the steam stock to provide for the increasing traffic would, in a very short space of time, absorb the steam stock thus displaced. As, however, I do not recommend proceeding with a small portion of the scheme only, I do not consider that you would be justified in providing new rolling stock throughout, more especially as the existing stock is of the cross-compartment type which, in that it provides large seating capacity and avoids the necessity for a large number of attendants on the trains, is in every way suited to the Melbourne suburban service.

(To be continued.)

#### EMPLOYEES IN ITALY.

The Italian State Railways in 1907 employed on their 8,293 miles of road 142,353 men, or 17 per mile of road—nearly  $2\frac{1}{2}$  times as many per mile as in this country, where the average



Proposed New Rolling Stock.

most advantageous. This design is really a combination of the two types, being a cross-compartment coach with a communication-way between compartments. Such a coach has been used on certain of the American and German lines and has been proposed for some of the English systems. The use of sliding doors that can be easily closed by the passengers without danger even after the train starts, avoids delay at station compared with the ordinary outward swinging doors, the absence of which also enables the coaches to be built of the maximum width, since even if the sliding doors were inadvertently left open there would be no danger of fouling passing trains as would be the case with swinging doors. Thus, in the case of Melbourne you would, while retaining the large seating capacity of the cross-compartment coaches, also obtain the advantages of the communication passage between compartments; such a design of coach is a combination of the best points of the latest types of suburban stock of Europe and America.

The estimated cost of a coach body of this type complete with trucks, but without electrical equipment, varies from £1,650 to £1,790 according to the class of compartment and the provision made for motormen's and guards' compartments.

While any new stock should, I think, be built generally in accordance with this design, it does not follow that you would be justified in scrapping all the existing stock and, if it be not scrapped and new stock built, the question arises as to what the existing stock should be used for. The importance of this question is obviously in inverse proportion to the magnitude of the electrification scheme. If the contemplated conversion affects only a small fraction of the stock, the provision of new electric stock could be easily justified, since the neces-

sity for continually adding to the steam stock to provide for the increasing traffic would, in a very short space of time, absorb the steam stock thus displaced. As, however, I do not recommend proceeding with a small portion of the scheme only, I do not consider that you would be justified in providing new rolling stock throughout, more especially as the existing stock is of the cross-compartment type which, in that it provides large seating capacity and avoids the necessity for a large number of attendants on the trains, is in every way suited to the Melbourne suburban service.

#### STROUSE PATENT LOCOMOTIVE STOKER.

This stoker was invented by an Iowa Central locomotive engineer, and has been developed on that road, the first tests being made in September, 1907. The stokers show a saving in fuel of 15 to 20 per cent. compared with hand firing. The fires do not require cleaning on the line on a division 182 miles long; the boilers maintain uniform steam pressure and the tubes give no trouble from leaking. Two locomotives equipped with the stoker have been in service on the Iowa Central for more than a year, and it has recently been ordered for 20 new locomotives for the Chicago and Alton.

The stoker consists, briefly, of a horizontal plunger mounted in guides and operated by a steam cylinder. This plunger carries at its forward end a special shaped distributor, which is arranged to discharge the coal on different parts of the grate, depending upon the speed and length of stroke of the plunger. The forward stroke of the plunger throws the coal forward and to the sides of the grate, and the backward stroke, by means of pockets in the distributor, places the coal on the back corners and rear of the grates. The coal is fed into a large hopper from which it falls upon the distributor. The fire door opening is provided with a specially designed door, hinged at the top, and is opened and closed automatically by the movement of the throttle lever. The whole apparatus, except the special fire door, is mounted on a framework sup-

ported by small wheels, and is secured to the fire door ring by two slotted lugs with keys, and also by two suspension turnbuckle rods which hook into eyes on the boiler head. The length and intensity of the stroke of the plunger are

endurance to properly perform all of his duties, and also preserve the firemen's eyes and health; to require only simple, brief, plain instructions to be efficiently operated; to fire practically perfect throughout the longest and heaviest runs; to reduce cleaning of fire to minimum; to maintain full uniform steam pressure all of the time, permitting engine to be worked to its fullest capacity. They are meant to be suitable for all types and sizes of locomotive fireboxes, and to be easily and quickly attached or detached; and to allow easy inspection of the fire at any time. They require little or no adjustment for changes in coal or in other condi-



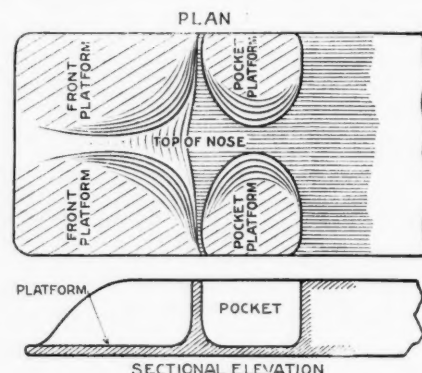
Strouse Locomotive Stoker.

governed by levers, shown at the left side, which are operated by the fireman.

The stoker is constructed almost entirely of cast and wrought steel and is consequently strong and durable. The wearing parts are made extra large, thus reducing the maintenance to a minimum and increasing the reliability to a maximum. The workmanship is of the best quality throughout and all the stokers are thoroughly tested under pressure at the works before shipment. All parts are made interchangeable so that any part can be cheaply and quickly replaced.

The operation of the Strouse stoker is very easy, as the fireman simply fills the hopper, and then by moving the stoker throttle lever operates the stoker according to demand. Usually no regulation is required, as the distributor is designed to fire the engine perfectly without any adjustment, but the length and strength of the stroke is easily governed at any time required by simply moving the stroke lever.

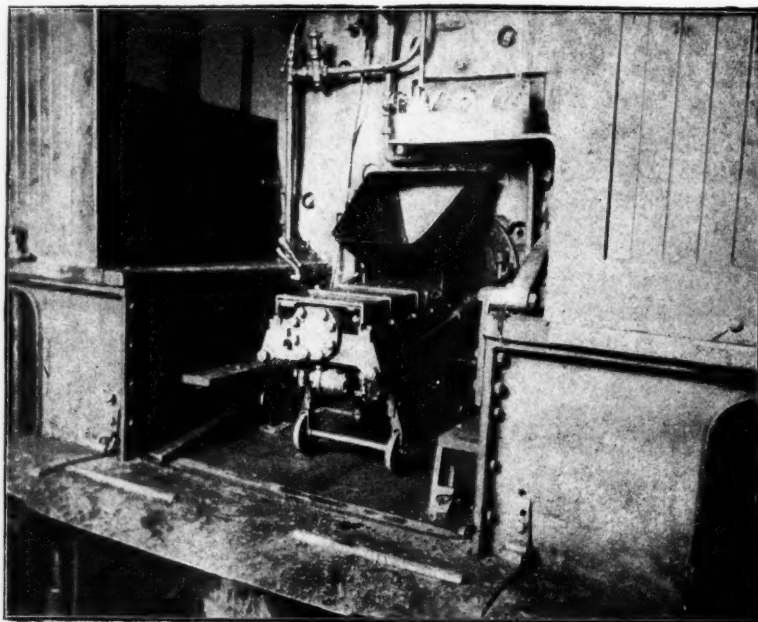
The Strouse stokers are designed to be absolutely reliable, durable, simple, compact and easily operated; to fire successfully all sizes and kinds of coal, including inferior grades of coal; to produce a very substantial saving in coal under ordinary operating conditions; to control admission of air into the firebox; to fire in small quantities at frequent intervals, according to demand; to maintain a light, bright, clean and uniform fire which will require less draft; to permit the use of larger nozzles, reduce the back pressure, prevent clinkers, reduce the smoke, etc.; to enable the average fireman to produce results continuously better than expert hand firing; to reduce the labor of the fireman, giving him more time and



Plan and Sectional Elevation of Plunger.

tions; reduce the flue and firebox leaks and repairs, and make no objectionable noise. There are no parts fixed inside the firebox to warp or burn out, and there is automatic draft relief when the engine slips.

These stokers now fire heavy consolidation engines on the longest and heaviest runs, with full tonnage, with practically no variation in the steam pressure and without any other attention to the fire except the shaking of the grate occasionally, and, moreover, the fire is usually in perfect condition at the end of each run, even when burning inferior grades of coal. These stokers are manu-



Strouse Stoker in Position.

factured by the American Automatic Stoker Company, 213 Railway Exchange, Chicago.

The Swiss authorities will provide for a session of the International Railway Congress in Berne, July 3 to 16, 1910.



# MR. ARNOLD'S REPORT ON NEW YORK SUBWAY TRAFFIC.

Bion J. Arnold, Consulting Engineer, has made his sixth report on the subways operated by the Interborough Rapid Transit Co. in New York, and a brief report of his conclusions was given in the *Railroad Age Gazette* of January 29, page 233. Previous reports were noticed in these pages last year.

The present report is based on studies of train movements and passenger movements. The number of passengers carried in the subway for the first four years of its operation was as follows, in millions:

1905.....	116.2	1907.....	182.6
1906.....	149.8	1908.....	221.0

The principal recommendation made is that the local traffic, that done by the trains which stop at all stations, be cultivated and improved to the utmost, because it is more profitable than that carried by the express trains. On the express trains many passengers are carried 15 miles for five cents, which is far below cost. The opening of the Brooklyn extension early in 1908 decreased the sales of tickets at the Brooklyn Bridge station in Manhattan by over 20 per cent., but the sales at the stations south of there increased. It appears that passengers who formerly came over the bridge from Brooklyn and went thence north by the subway, now come through from Brooklyn by the subway; and many of the Bowling Green, Fulton street and Wall street passengers travel to and from Brooklyn by the subway. It is estimated that the ticket sales in Brooklyn will be at about the following rates per year, in millions:

Borough Hall .....	7.5	Nevins street .....	2.5
Atlantic avenue .....	9.5	Hoyt street .....	2.5

or a total of 22 millions a year. Mr. Arnold calls this a fortunate addition to the subway business, as most of the Brooklyn passengers ride comparatively short distances, and the current of traffic is opposite to the heaviest currents of the Manhattan traffic. No precise estimate is made of the heavy fixed charges due to the cost of the Brooklyn extension.

The decrease in the traffic of the subway during the summer months is much more marked than the decrease on the elevated roads at the same time. The lightest traffic of the week on the subway is on Sunday and the heaviest is on Monday, when shoppers are out for the bargains which have been advertised in the Sunday papers. The subway is now carrying from 650,000 to 750,000 passengers a day, and the heaviest day on record is December 21, 1908, when 886,000 were carried. On Sundays, except in bad weather, the traffic is from 350,000 to 450,000.

All of the trains are uniformly late during the rush hours. This is due to the longer stops at the stations and not to any inability of the motors to haul the heavier loads. From the Brooklyn bridge to Ninety-sixth street, 6.43 miles, the schedule time of express trains is 16 minutes. In the rush hours the time taken is about 21 minutes. These are the records taken about a year ago. By shortening the track circuits at the stations, and by introducing the speed control signals at Ninety-sixth street (recently noticed in the *Railroad Age Gazette*), the service has now been improved so that often trains reach their destination only two and a half minutes behind time, instead of five minutes behind. The local trains are also delayed by the rush of passengers, their schedule time of 26 minutes being lengthened to 28 or 30 minutes. These delays are due mainly to the longer stops at those stations where passengers transfer from the locals to the expresses and from the expresses to the locals.

Observers were employed to count the passengers on a number of individual trains in January, February and March, 1908. On eight local trains the average total number of passengers carried on each trip was 2.58 times the maximum number on the train at any one time; on 10 express trains this ratio was 1.62. In other words, the local trains are partially emptied and partially refilled, while on the expresses the larger share of the passengers take long rides. The local

trains carried 4.36 passengers per seat, while the express trains carried from 3.24 to 3.62 passengers per seat. The average distance traveled by passengers on local trains was about two miles, and on the expresses about 5.5 miles.

Careful counts were made to see what proportions of the passengers secured seats. There is a much more even distribution of passengers through the cars of an express train than through the local trains, due apparently to the fact that passengers will take more trouble to avoid a crowded car on an express than they will when making a short trip on a local train; but considerable improvement could be made, says the report, in more evenly distributing the passengers throughout the length of all trains. On the heaviest trains, for a good part of the trip, there were about as many passengers standing as sitting, and in some cases more; that is to say, trains with 416 seats frequently contained over 900 passengers. In one case the total number was 1,050.

Studies were also made of the hourly variation in traffic. Of the passengers traveling in one direction during the day, fully one-third travel during the two hours of the rush period.

Mr. Arnold estimates that with side doors in the cars and a ninth car added to the express trains in the rush hours (without lengthening the platforms), the capacity of the subway in seats per hour may be increased from 22,000 passengers an hour to 36,000 passengers an hour. In this connection he makes the following estimate:

## Capacity of Express Trains in Seats per Hour.

	Increase.	Total.
Capacity during fall of 1907.....	.....	12,000
Improvement during year 1907.....	1,250	13,250
Improvement anticipated due to additional doors in sides of cars near ends.....	1,250	14,500
Improvements anticipated by use of a speed control signal system .....	650	15,150
Improvements anticipated due to changes at Ninety-sixth street .....	850	16,000
Additional capacity to be secured by running 9 cars in each express train, instead of 8 cars.....	2,000	18,000

But at best the subway will be crowded during the rush hour period, and the only remedy is to build new subways. In future construction each express track should be doubled at the stations so as to permit two trains to be unloaded at the same time.

Another recommendation made by Mr. Arnold is to provide storage for empty cars at terminals, so that cars going south in the morning loaded will not have to run back northward empty because of lack of room. This same wasteful running of empty cars occurs in the opposite direction in the afternoon, so that there should be storage room at the north end also. He also says that considerable economy should be secured by adopting an automatic coupler, so that cars could be taken on or left off at intermediate points. This point will be of interest to long-distance railway managers who haul heavy cars many miles at high speed to avoid the delay necessary to attach or detach a car and test the brakes. This practice is common on some roads where seemingly two minutes would be less valuable than on the subway lines.

The figures on which Mr. Arnold estimates the average earning capacity of the trains are in substance as follows:

Of 1,400 passengers using a local train, 326 have come from express trains and 474 are on their way to express trains leaving 600 passengers, or 43 per cent. of the total number, using the local trains who are strictly local passengers riding from one local station to another.

The express stations contribute an average of 114 new passengers and the express trains transfer an average of 326 passengers, making a total of 440 passengers to each local train to offset the 474 passengers which the locals furnish to the express service.

Of the 1,400 passengers who patronize a local train there are 474 who transfer to the express trains. The income from this local trip may therefore be taken  $(1,400 - 474) \times 5c.$ , or \$46.30, and as this train is composed of 5 cars and has traveled an average of 9 miles in one direction the income per car-mile for this part of the trip is equal to  $\frac{\$46.30}{5 \times 9}$ , or \$1.03 per car-mile for rush hour service.

In a similar way the income from an express train carrying 1,300 passengers may be found by deducting the 326 passengers who transfer to the local trains, making the income for one express train north-bound trip  $(1,300 - 326) \times 5c.$ , or \$48.70. This express train, how-

ever, consists of 8 cars and travels an average of 15.38 miles in one direction, thus reducing the income per car-mile to  $\frac{48.70}{8 \times 15.38}$ , or 39 cents.

This result confirms the conclusions that the earning efficiency of the local service is more than twice that of the express service.

The local service is capable of not only maintaining itself, but it can also earn enough more to maintain the burden of the entire collecting and distributing system of which it is a part and assist in compensating for the loss due to long haul business carried by the express trains.

In conclusion, Mr. Arnold recommends that if the uniform five-cent fare is to be retained, the short haul business must be developed to make a profit sufficient to support the unprofitable long haul traffic by express trains. Possibly, he says, the moving platform may prove to be the most economical way of moving passengers short distances.

#### NEW AUTOMATIC SIGNALS ON THE BOSTON & ALBANY.

In the recent installation of automatic block signals made by The Hall Signal Company on the Boston & Albany, the signals are of the upper quadrant, three position type, and a number of special features and new types of instruments have been used on the work. The signals are situated between Westfield, Mass., and Rensselaer, N. Y., on different tracks and sections, as follows (parts of the line being already signaled): West bound track between Westfield and Washington, 29 miles; east bound track between Chester and Washington, 14 miles; west bound between Pittsfield and Richmond, 9 miles; and east bound between Niverville and Rensselaer, 16 miles; in all 95 automatic signals and 8 slots applied to mechanical signals. The contract was signed September 3, 1908, with a stipulation that the work be completed, and signals reported ready for service, January 1, 1909. The signals were reported ready for service December 30, the entire work thus requiring less than four months to complete. Taking into consideration the amount of special apparatus designed for the work and the territory covered, a new record has probably been established.

The circuit for the control of the signals is arranged "normal danger." The signals are made to assume the forty-five degree position (one block clear) by the presence of a train two blocks in the rear, and the ninety degree, or all clear position, by the presence of a train in the block approaching the signal. Clearing relays, such as have generally been used in normal danger circuits, are not used on this installation; the line wire for the home control is carried through a back contact on the track relay in the rear, which provides a positive clearing action. A section of the wiring diagram is shown.

No. 10 B. & S. gage, hard drawn copper wire with double braid weatherproof insulation is used for the line. The connections from the line to signals on the line side are carried overhead and into the signal cases through a hooded pipe connection on top of the cases. The wires carrying current are marlined together, but not taped nor braided, and are tied at intervals to a steel messenger wire which is fastened to the pole, just above the case. At locations where the signals are on the side of the tracks opposite the pole line, the wires are carried from the line into a junction box, clamped to an iron post, in the same general manner. The junction posts are provided with a hook under the pinnacle, for fastening the messenger wire, and a hooded pinnacle through which an entrance is effected for the wires inside the post and to the junction box. These posts are also arranged with two hooded openings at the ground line, at right angles to each other, for the trunking leads. One of these leads runs to the track and the other to the battery well. All the trunking is placed so that the top of the capping is flush with the top of the ballast. Thus all the wires are readily accessible, a feature which will be of interest to signal engineers who cover their wire leads with trunking and ballast. The objection to this construction that has frequently been raised in the past,

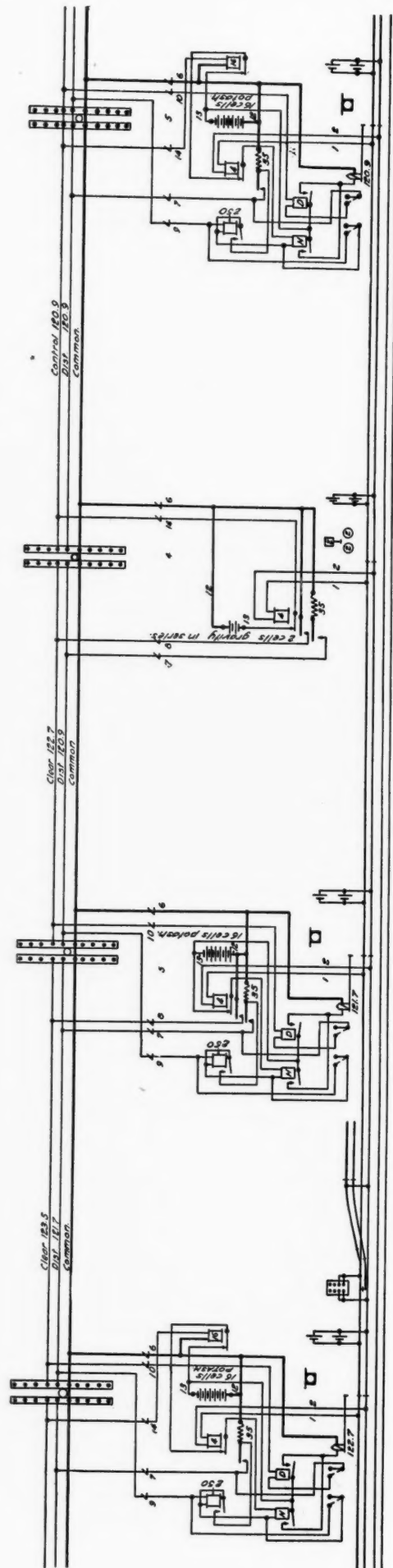


Fig. 1—Wiring Diagram for Normal Danger Hall Automatic Block Signals on Boston & Albany.



namely, that the right of way is obstructed by unsightly poles and wires, may readily be refuted by a trip over this section of the Boston & Albany.

The wires from the line to the signal and junction posts are No. 14 B. & S. soft drawn rubber-covered copper wire, and No. 10 B. & S. soft drawn copper wire is used for the

connections from junction boxes to track and for all wires in trunking. All rubber covered wire used was made in accordance with the specifications of the Railway Signal Association. In the track connections the soldered connection of the copper and iron wires is made outside the trunking, where inspection may readily be made.

The signal mechanism used is The Hall Signal Company's improved Style F, three position thrust mechanism. The shaft for the blade grip is mounted on the right hand side of the post as in the standard designs of lower quadrant signals, but the motion is reversed by a link arrangement of cranks in the shaft bearing. A view of the mechanism is shown in Fig. 2, and of the up and down rod connections in Fig. 3. No rack or gear movement is used for the change of motion, this being accomplished by a novel arrangement of links and cranks.

The signal posts are mounted on a single mechanism case with doors on both front and rear. The cases are set on a concrete foundation, the top of which is one foot above the top of the rails. The center of the blade is 21 feet above the top of the foundation, or 22 feet above the top of rail in ground post signals. On bracket signals, the top of the bracket is 22 feet above the top of rail, and the center of blade 8 feet above the top of bracket, making the center of blade 30 feet above the top of rails. Bracket posts are made of steel pipe, 8

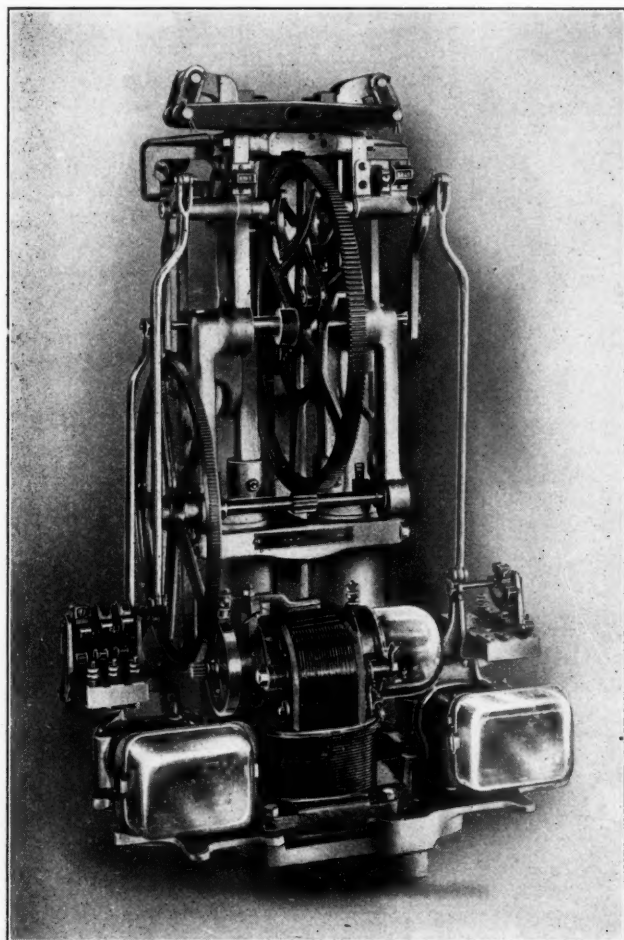


Fig. 2—Hall Electric Motor for Semaphore.

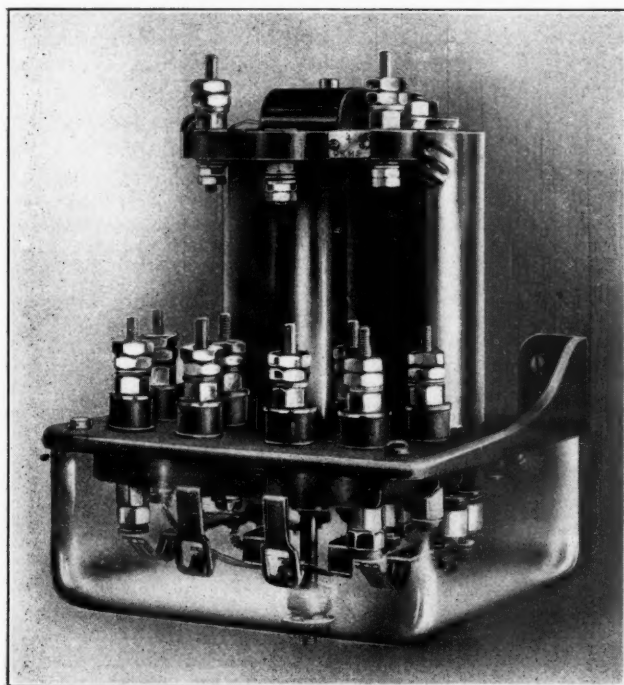


Fig. 4—Track Relay.

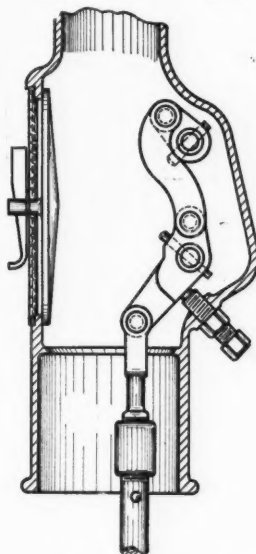


Fig. 3—Semaphore Connection.

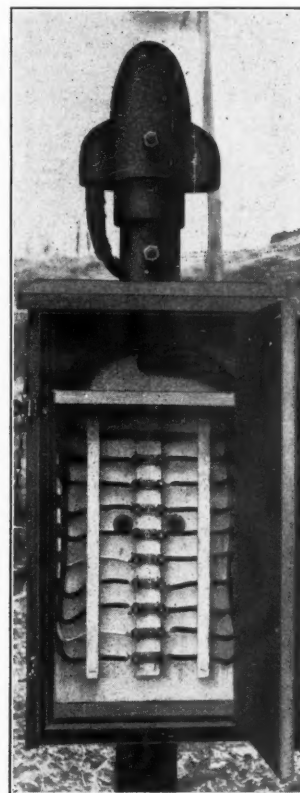


Fig. 6—Junction Box.

inch and 9 inch sections swaged, sulphured in a heavy cast iron base and with channel and angle cross-trees and braces. In all of the automatic signals an extra lamp, with red lens in front, is placed three feet below the signal lamp and on the opposite side of the post. This is the marker arrangement proposed by the committee of the Railway Signal Association.

The relays used in this installation are illustrated in Fig. 4. They are of the wall type and were designed from specifications submitted by the Signal Engineer of the Boston & Albany. This is a very compact instrument and has a number of novel features. The binding posts are so arranged that a very neat arrangement of wiring in signal cases and relay boxes is possible. The wires, coming from the top of the signal case or box are passed through distributing strips to the lightning arresters or brass terminals, and thence to the instruments. Fig. 5 shows a view of the inside of a relay box and Fig. 6 a view of the inside of a junction box. At all straight post signals the relays are placed in the signal cases,

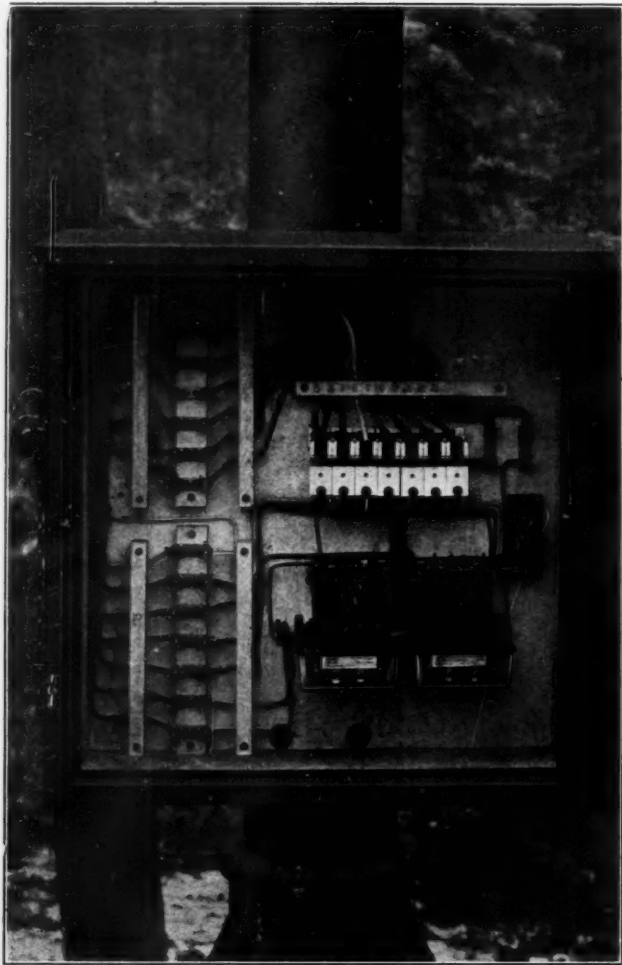


Fig. 5—Relay Box.



Fig. 8—Automatic Three-Position Block Signal—One Block Clear.



Fig. 7—Automatic Three-Position Block Signal—Two Blocks Clear.

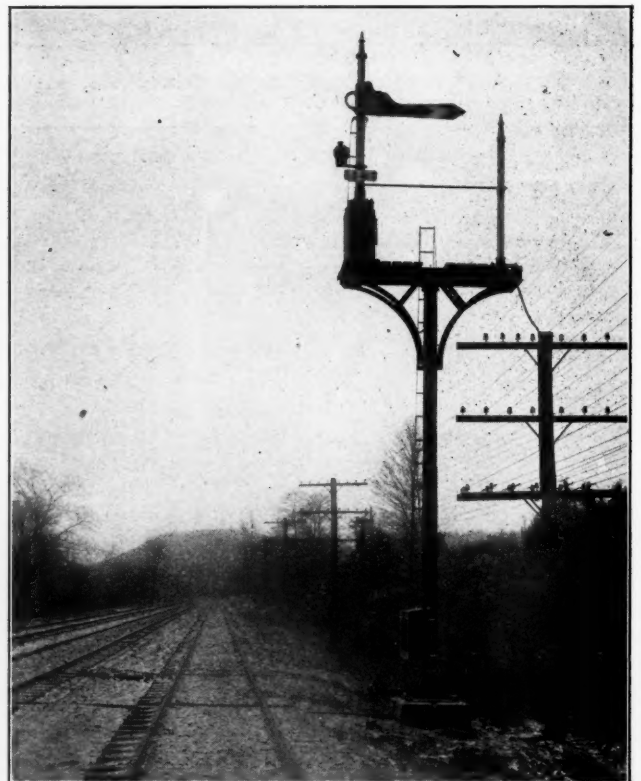


Fig. 9—Bracket Signal.



but at bracket posts they are placed in relay boxes clamped to the bracket posts.

The blade grips used on this installation are the Hall Company's standard upper quadrant spectacle, made of sheet steel riveted on a cast iron hub at the shaft support. The posts are of such a height as to make the top of the pinnacle reach to the center of the blade when the signal is clear. Views of ground post and bracket signals are shown in Figs. 7, 8 and 9.

Gravity battery is used for the operation of the track circuits, and Waterbury and Gordon potash batteries for the motor and slot circuits. The potash battery is placed in Massey concrete wells. At signal locations the gravity battery is put in the same wells but at cut sections and points where wells are not required it is put in chutes.

The signals were installed by the Hall Signal Company, from specifications made by J. M. Fitzgerald, Signal Engineer of the road, and the work was done under the supervision of F. A. Whitcomb, Supervisor of Signals.

### THE VALUATION OF RAILWAYS.

#### III.

Good will, an established organization, and a loyal esprit de corps are expensive to acquire, in money equivalent, skill, patience and talent; and while they do not appear on the balance sheet of any railway, are nevertheless things of real value. A manufacturing plant with an experienced administrative organization, trained and disciplined operating staff and an established trade, has a commercial and an economic value in excess of a new and similar concern of corresponding cost and in corresponding physical condition. Is the case affected by the public nature of the service provided by carriers, and by the degree of monopoly they enjoy and exercise? In respect of a railway, good will and organization, as an inducement to patronage, inure to its material advantage; but as enabling efficient service, economical operation and the maintenance of revenues notwithstanding low rates and fares, they are no less an asset in the hands of the public.

The exact weight, therefore, that should attach to these intangible values in the appraisal of railway property is a question not easy of determination. It is not improbable that most of the railways would willingly waive their rights with respect to these values, and possibly other similar ones, if secured in the enjoyment of a legitimate rate upon the direct cost, original and subsequent, of their properties; but whether it would be in the public interest thus to remove the stimulus to excellence and place a premium upon inefficiency, is questionable.

The table submitted below shows the amount of money in circulation in the United States per capita (Reference: Statistical Abstract of the U. S., 1907, p. 17), and the average price of a number of selected commodities, each proportioned to consumption (Dun's Index Number), at the times stated:

	Circulation per capita.	Average price of commodities.
July 1, 1866.....	.....	\$207.978
" 1, 1876.....	\$16.12	116.479
" 1, 1886.....	21.82	89.226
" 1, 1896.....	21.41	74.317
" 1, 1906.....	32.32	105.216

In appraising the value of the road, equipment and other property of a carrying company as of the last date stated, when the per capita circulation was \$32.32 and the average commodity price was \$105.216, should the carrier receive special consideration by reason of expenditure made in 1896, when the per capita circulation was only \$21.41 and when the utility of a unit of currency was greater by 40 per cent.? Or, is it sufficiently compensated for its outlay by the same rate of income, on the cost of property, that would have been reasonable and just at that time? The owners of commercial property are benefited in price by increased circulation (unless offset by other circumstances) and other conditions which operate to elevate the level of commodity prices. It is held

that a security yielding a fixed rate of income does not so benefit; but the correctness of this theory has not been fully demonstrated. Moreover, the creditor can protect himself against such changes, in part at least, by altering his position with respect to a particular class of investment—a course not open to the carrier as such.

These and other similar considerations may tend to determine the superiority of an appraisal over other methods of valuation.

The point, no doubt, around which thought should revolve for the present is a valuation by appraisal—ascertainment of reconstruction cost—modified by larger bona fide outlay where it can be shown.

Once an official valuation is made, an excess in capital assets as compared with nominal capitalization could be provided for by writing up such assets, crediting surplus, which excess would be subject to future capital issue. A corollary of this, in the case of a possible deficiency in assets, would be to write the amount of the deficiency off the assets and capital stock. Par value need not be interfered with; the nominal amount could, if desired, be shown in the nature of a memorandum, and the amount paid up be extended as a liability. As to the distribution of profits, the status of a shareholder would be unaltered, his holdings representing the same proportion of the total as before.

It had been far better for the railways themselves if their property and stock accounts had been treated from the beginning in the manner above indicated. By this means capital assets would have been carried at their proper cost, additions thereto from revenues would have been shown in the same manner as if provided for by assessments on capital stock, and the accounts would have reflected facts rather than fictions.

We should divest ourselves of the impression, if not the belief, that the proposal to subject railway property to a valuation is in effect an attempt to assail values, or that it would necessarily or probably result in the impairment of values to any appreciable extent. The protection of the rights and the enforcement of the obligations involved, must be the motive, as it is the vindication, for a valuation. Not improbably, it would reveal isolated instances of deficient value in comparison with nominal capitalization; but it does not necessarily follow that the carrier, its owners or creditors, would sustain injury from the mere ascertainment of the fact. It is not inconceivable that, even in such extremes, substantial benefit might accrue to each of these interests through the drawing of a line beyond which restrictive regulation might not pass, and the establishment of a definite basis for revenues.

But admitting for the moment the force of the objection made, no violence is done to the principles or the accepted notion of practical justice; it is applicable in the same sense and in a like degree to the majority of the laws on the statute books, and equity jurisprudence had its origin in the recognition of this truth.

But the task set before us is not completed by the mere ascertainment of railway values. There remains the separation of the portion of value devoted to interstate, from that appropriated to intrastate use. The succeeding extract is to the point:

"In our judgment, it must be held that the reasonableness or unreasonableness of rates prescribed by a state for the transportation of persons and property wholly within its limits must be determined without reference to the interstate business done by the carrier, or to the profits derived from it. The state cannot justify unreasonably low rates for domestic transportation, considered alone, upon the ground that the carrier is earning large profits on its interstate business, over which, so far as rates are concerned, the state has no control. . . . It is only rates for the transportation of persons and property between points within the state that the state can prescribe; and when it undertakes to prescribe rates not to

be exceeded by the carrier, it must do so with reference exclusively to what is just and reasonable, as between the carrier and the public, in respect to domestic business. The argument that a railway line is an entirety, that its income goes into, and its expenses are provided for, out of a common fund; and that its capitalization is on its entire line, within and without the state, can have no application where the state is without authority over rates on the entire line, and can only deal with local rates and make such regulations as are necessary to give just compensation on local business." (Reference: *Smyth v. Ames*, 169 U. S., 466.)

It is believed that such apportionment of value to the respective uses is possible, with a minimum of arbitrary choice, on the basis of the units of product—that is, the passenger mile and the ton mile—having due regard for the proportion of passenger to freight traffic and for the classification of both.

Moreover, the legal right to realize a stated yield upon a determined value is in itself of little importance if natural condition or economic law interposes to prevent its enjoyment. It is not only possible but highly probable that, to restrict those railway companies whose traffic is most dense, whose roadway and equipment are best, and whose operating efficiency is greatest, to a rate of income which would be just and reasonable in the average, would be to disturb the entire rate situation. Inequalities must arise from such conditions as the competition of water routes; the competition of rail lines upon unequal terms; sparse traffic; expense of construction or operation disproportionate to traffic, etc.; but such inequalities are susceptible to correction by the application of the pooling principle. This is the principle that would apply if all the railways were combined into a single system, and it is the principle that now applies to every large railway. Not every part of a line is equally productive in proportion to investment outlay. But the relatively unproductive portion is scarcely less necessary than the more productive, and it seems eminently proper that the stronger should be made to contribute to the support of the weaker.

So far as concerns the carrier, taxation would not be highly important if taxes are considered as part of the expense of operation and if net revenues sustained an equitable relation to investment. A possible excess in taxation would be relieved through its rates and fares, in part at least, upon the patrons of the carrying company. But the burden might readily fall to devolve upon those who ought to bear it within the state, and might further be levied thus indirectly upon interstate shippers and travelers, in contravention of the accepted principles of taxation. It may appear that, strictly defined, the rightful limit of state taxation is the intrastate use of transportation property, valued in accordance with the assessment of other like property, and at a like rate. Whether this view is tenable or not, it is certain that in equity and good conscience the tangible property of railways should not be assessed for taxation at a higher valuation or rate than other real and personal estate, and that their intangible property should not be made the pretext for imposing an unequal share of taxation upon them. Especially is this true when, as at present, the mere law of expediency is the dominant factor in rate making and the paramount consideration in rate regulation. Neither should they be taxed upon a valuation greater than that reached by the funding of net revenues or gross corporate income at a suitable annual rate, reduced by the prevailing margin between assessed and actual values. When the taxes of railways show increases of 15 per cent., 25 per cent., and 35 per cent. from one year to the next, at a time when traffic and revenues are almost correspondingly diminished, there is grave question whether these limitations are being exceeded. Here, again, the advantages of a valuation become apparent.

There may properly be question as to what constitutes a just and reasonable rate of income. Obviously, it will depend upon whether the investment is secured, upon the degree of

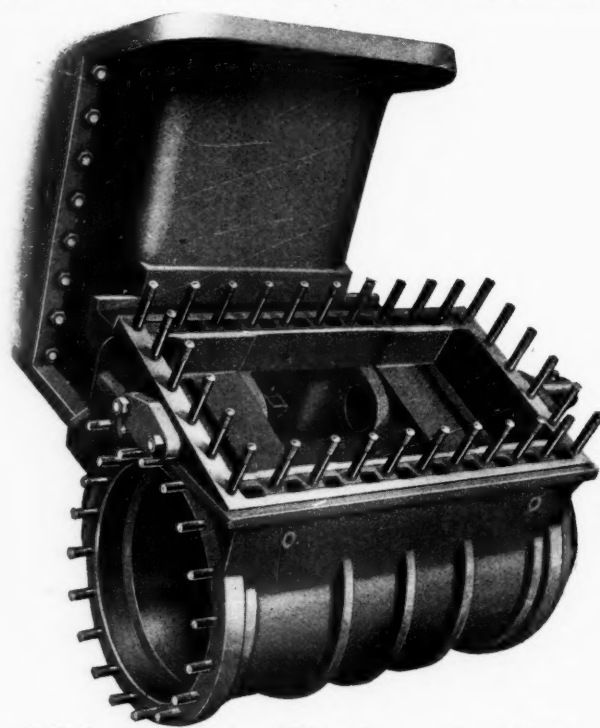
security, and whether it is unassisted or requires the aid of industry, skill, intelligence and talent. It is probably true that Government bonds, irrespective of the demand for them to serve as the basis for circulation under the national banking laws, could be sold at a price yielding 2 per cent. per annum, or less. The best corporate securities yield a return of from 3 to 4 per cent. But no one would think of entering upon a business enterprise which held the prospect of no greater profit upon his capital. The succeeding extract is taken from a recent article by Elijah W. Sells, C. P. A.: (Reference: *The Government Accountant*, June, 1908.)

"It is interesting also to note that the revenue to the investor from the interests in railways is far less than his revenue from an interest in manufactures. The average rate of net income on railway investments is only about 4 per cent., while the average net income from investments in manufactures is about 15 per cent."

(To be continued.)

#### THE ALLFREE LOCOMOTIVE VALVE.

Among the numerous designs of valves and valve gears for locomotive engines, that known as the Allfree-Hubbell has probably been brought to the attention of railway officers as extensively as any others. It originally consisted of a gear as well as a valve, the fundamental idea of the combination



Cylinder Casting for Allfree Locomotive Valve.

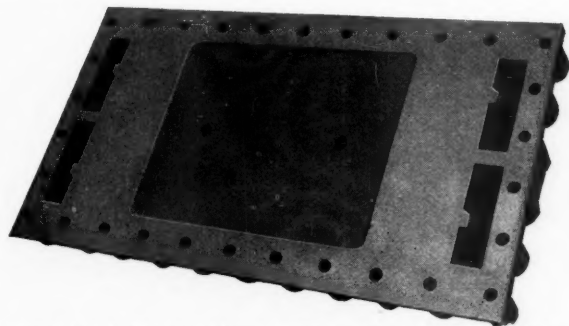
being to reduce the clearance space to a minimum by the use of very short and straight ports and also to reduce compression and provide only for bringing the reciprocating parts to rest. In other words, to delay the exhaust closure in the return stroke as late as possible.

While retaining the fundamental idea, as mentioned, the present device is a modification of the earlier designs, in discarding all of the special arrangements and parts outside the cylinder and steam chest, and now consists of a special design of cylinders and valves which may be applied to any locomotive and be operated by any form of valve gear. The object of this design is to produce a locomotive cylinder in which, for a given cut-off, the steam will be held as long as possible, then exhausted rapidly, and during the return stroke of the piston, closing of the exhaust passages will be avoided until very nearly the end of the strike.

While the device is very simple in principle, construction



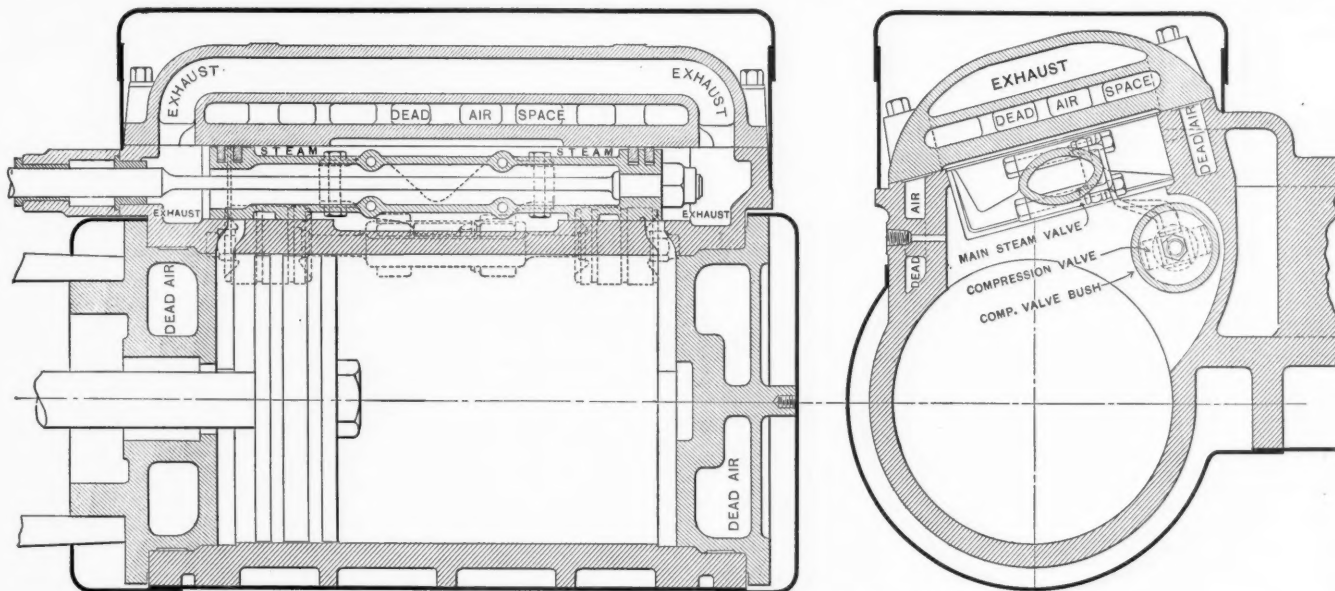
and operation, it will require some attention in order to properly understand it from the drawings, but such attention is well worth while. Two illustrations of sections of the cylinder and steam chest with the main valve are shown herewith. From the cross section it will be seen that the main steam chest is set at an angle of about 15 deg. with a horizontal and that on one side the valve face is close to the curve of the inside of the cylinder, while on the other side it is raised somewhat



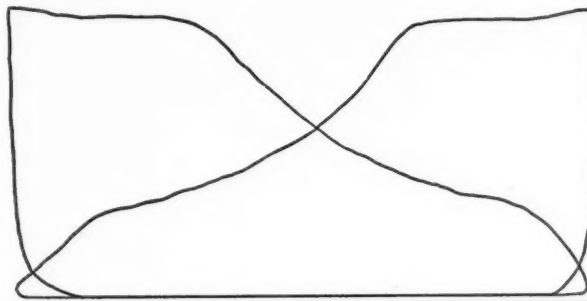
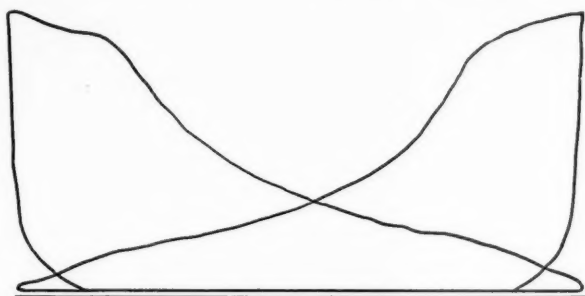
Combined Steam Chest Cover and Pressure Plate.

Admission and cut-off are controlled entirely by the main valve and inside admission is used. The half-tone engraving of the cylinder, with the steam chest cover and valve removed, shows the location of the circular compression valve chamber and to the left of it the entrance passageway for the live steam. The steam thus comes up against the under side of the valve and is admitted to the steam chest along the entire lower edge and up one side of the valve. It enters the cylinder through the long straight port in the usual manner, so that a large port opening is provided for admission. In passing from the steam chest to the cylinder the steam thus passes on both sides and around the compression valve chamber which cuts through the main port at each end but does not interfere with its area because of the increased depth of port, as shown on the cross section.

The exhaust is also controlled by the main valve, but to this is added the exhaust of the compression valve, thus increasing the exhaust area. It is in this compression valve that the whole gist of the delayed exhaust closure lies. The valve is driven by an arm projecting down to it from the main valve. This arm has, however, some lost motion between the points of bearing on the compression valve. Suppose for ex-



Sections of Cylinder and Steam Chest for Allfree Valve.



Sample Indicator Cards from Locomotive Equipped With Allfree Valve.

ample, that the piston has reached the end of its stroke to the left, as shown in the longitudinal section of the cylinder. The main valve has moved far enough to the left to have opened the lead for the admission of steam and the arm has struck the compression valve and carried it far enough to the left to have closed the exhaust and both valves are still moving to the left and will continue to do so until the end of the valve stroke is reached. The main valve then starts to return, and due to the lost motion between the arm and the bearing points of the compression valve, the latter remains stationary until this lost motion has been taken up. This delays the action and motion of the compression valve by that amount. When this lost motion has been taken up the two

above it. In the space thus left below the valve there is a chamber, circular in section, that is occupied by the compression valve having broad rings. This valve delays the closing of the exhaust and thus reduces the compression line to a minimum. The steam chest cover, which is reproduced by a half-tone engraving, forms the top side of the steam chest and provides through a cored passageway above, a by-pass equalizing passage between the exhaust chambers at each end of the cylinder. The main valve is rectilinear in form to fit the steam chest. It is balanced for all pressures and speeds and is provided with special riding or wearing shoes, so that the wear is uniform regardless of the travel.

ample, that the piston has reached the end of its stroke to the left, as shown in the longitudinal section of the cylinder. The main valve has moved far enough to the left to have opened the lead for the admission of steam and the arm has struck the compression valve and carried it far enough to the left to have closed the exhaust and both valves are still moving to the left and will continue to do so until the end of the valve stroke is reached. The main valve then starts to return, and due to the lost motion between the arm and the bearing points of the compression valve, the latter remains stationary until this lost motion has been taken up. This delays the action and motion of the compression valve by that amount. When this lost motion has been taken up the two

valves continue to the right, following the piston. The sequence of events is, first the main valve closes the steam admission port if the cut-off is early and in due course, closes the main exhaust opening on the right hand end. Under ordinary conditions the compression on the right would then begin, but owing to the delay in the movement of the compression valve the exhaust through it on the right remains open until it can be pushed across the opening left in the chamber which it occupies and which leads to the exhaust chamber at the end of the cylinder. It does not close this until the piston has nearly reached the end of the stroke when the main valve opens the exhaust at the left end. On the return stroke the cycle is repeated.

In examining the drawings it is simply necessary to remember that the main valve acts similar to any other inside admission valve and that attached to this is another valve that drags behind it, delaying the closing of the exhaust.

It is evident that the decreasing of clearance is of prime importance in locomotive economics, and if this can be reduced from the usual 10 per cent. to 2.5 per cent., there is a great gain in steam consumption for each filling of the cylinder.

By an increase of the exhaust lap, the opening of the exhaust can be delayed and thus the steam used through a higher degree of expansion for the same point of cut-off while the double opening afforded by the compression valve makes it possible to attain a rapid and effective exhaust which with the reduced compression at the other end of the stroke increases the effective area of the indicator card as shown in the sample cards reproduced. It is claimed that a saving in coal of about 10 per cent. or more can be obtained by the use of this device. The idea and its application are reasonable in that they involve but little more than that which belongs to the ordinary valve and its motion. The device uses nothing which has not been well tried out and the actual saving accruing from its use can be readily determined. The arrangement here described has been developed by E. H. Allfree and is controlled by the Locomotive Appliance Company, Old Colony Building, Chicago.

#### TEST OF LLOYDELL COAL AND BRIQUETS ON THE LOCOMOTIVE TESTING PLANT AT ALTOONA.

Bulletin 363 of the United States Geological Survey relates to comparative tests of run-of-mine and briquetted coal on locomotives, and was edited by W. F. M. Goss. It includes also torpedo boat tests of briquettes, foreign specifications for briquetted fuel, especially for railway use and road tests of briquettes on the Atlantic Coast Line and the Chesapeake & Ohio. An elaborate and carefully executed series of tests involving the use of natural coals and of briquets made from the same coal previously crushed, which tests have been carried out on a locomotive at the testing plant of the Pennsylvania Railroad at Altoona, is also described. The last named tests were made under the direction of A. W. Gibbs, general superintendent of motive power, by E. D. Nelson, engineer of tests, and the following report is abridged from the more elaborate report of results which was prepared by Mr. Nelson.

##### PURPOSE OF THE TESTS.

Many low-volatile coals, such as those mined in the vicinity of Johnstown, Cambria County, Pa., are semi-smokeless and therefore very desirable for use in locomotives at or near terminals; nevertheless, on account of their low evaporative efficiency, they have not been found altogether satisfactory when used as a locomotive fuel. Their tendency to disintegrate rapidly on the grate during combustion causes large quantities of cinders and sparks of high calorific value to be discharged. These cinders accumulate in the smoke box of the locomotive, obstruct the draft and reduce the capacity of the boiler. The investigation here reported, therefore, was undertaken to determine in what measure, if any, the process of briquetting will serve as a remedy for these defects and to discover the effect of the process on efficiency and capacity.

The coal selected for the tests was taken from a mine working the Lower Kittanning coal bed near Lloydell, Cambria County, Pa., on the South Fork branch of the Pennsylvania Railroad. This coal was practically the same as that mined in the Scalp Level district of Pennsylvania, which was used in all the locomotive tests made by the Pennsylvania Railroad at the Louisiana Purchase Exposition in 1904. Its characteristics as a locomotive fuel were therefore well known. The Lloydell coal is a very friable, low-volatile bituminous coal, and the carloads selected for the tests consisted of run-of-mine. The coal was exposed to the weather for 30 days on the way to the St. Louis testing plant, before being briquetted. It showed but little change due to this exposure except a decided increase in moisture, which, however, was eliminated in the briquetting process.

The briquets tested were of two sizes, and the amount of binding material in them ranged from 5 to 8 per cent. The larger size, called in the tests "square," was rectangular in form, about 3 in. x 4 1/4 in. x 6 3/4 in., with slightly rounded corners, and weighed about 3 1/2 lbs. The smaller size of briquet, called "round," was cylindrical with convex ends, had a diameter of about 3 in. and a length over the convex ends of 2 in. and weighed about 1/2 lb.

The binding material in all the briquets was water-gas pitch. This material was furnished at the briquetting plant of the United States Geological Survey, in St. Louis, at \$9 per ton, or 0.45 cent per pound. The least amount of binding material that would make perfect briquets was found to be 5 per cent. of the weight of the coal. The cost of the binder in one ton of the 5 per cent. briquets was therefore 45 cents.

The cost of briquetting, including all charges, is estimated to be about \$1 per ton of briquets; that is, the briquetting added approximately \$1 per ton to the cost of the coal. The briquets were made, however, in an experimental plant, and the price is for this reason probably not so low as if they had been made on a much larger scale.

The briquets were made by the fuel-testing plant of the United States Geological Survey at St. Louis. The method of making the briquets is described in detail in previous reports of the Geological Survey. In this process the binding material is mixed with the crushed coal, the mass is softened by contact with steam as it passes to the briquetting press, and the briquet is finally formed in a compressing machine.

The locomotive used for all tests was a simple Atlantic (4-4-2) type passenger locomotive of the Pennsylvania Railroad, class E2a. This engine had cylinders 20.5 in. diameter, with a piston stroke of 26 in. Its firebox heating surface was 156.86 sq. ft. and the tubes 2,162.4 sq. ft.; totaling 3,319.26 sq. ft. The steam pressure was 205 lbs. per sq. in. In order to obtain results covering all practical rates of evaporation up to the limit of the boiler capacity, tests were made with each style of briquets and with the natural coal under the following conditions of running: First, a low evaporation test at 80 r.p.m. and 15 per cent. cut-off; then a higher evaporation test at 120 r.p.m. and 20 per cent. cut-off; next a still higher evaporation test at 160 r.p.m. and 25 per cent. cut-off; and finally a test made at the maximum possible evaporation. With the briquetted coal this maximum-capacity test was at 200 r.p.m. and 32 per cent. cut-off. Four, or at most five, tests were thus sufficient to cover the range of boiler capacity.

##### RESULTS OF TESTS.

A summary of the observed and calculated results is presented in the subjoined tables. The data tabulated represent the performance of the boiler and furnace more or less completely; as tests of coal concern primarily the boiler, the record of the engine performance is much abridged, only a few of the more important results being included.

Graphic logs for the tests are also shown. These are presented to explain some apparent irregularities in the plotted results. For example, in Test 1, the constant slope of the



water and coal lines and the absence of abrupt fluctuations in the steam-pressure line show at once the accuracy of the results. In Test 4 the change of slope in the coal line at the beginning and the end of the test make the reliability of observations during these periods seem more or less doubtful.

## ANALYSES OF COAL AND BRIQUETS.

The proximate analyses and the calorific values of the fuel are given as columns 31 to 36 in the table of fuel analyses.

Test No.	Laboratory symbol.	Date of test.	Duration of test (hours).	Position of reverse lever (notches from center forward).	Barometer pressure (pounds per square inch).	Boiler pressure (pounds per square inch).			Temperature of laboratory (°F.).
						Average.	Maximum.	Minimum.	
1	80-15-F	May 2	3.0	15.5	14.20	201.4	205	196	63
2	120-20-F	March 17	3.0	15	14.02	203.5	206	198	60
3	160-25-F	March 17	3.0	15	14.02	202.2	206	192	65
4	160-25-F	March 17	3.0	15	14.17	201.1	205	192	64
5	160-30-F	May 3	3.0	15	14.16	193.9	205	179	61
6	80-15-F	May 8	3.0	15.5	14.11	204.2	206	202	65
7	120-20-F	May 8	3.0	15	14.12	204.8	206	200	65
8	160-25-F	March 23	3.0	15	13.96	202.5	205	196	60
9	120-20-F	May 9	3.0	15	14.05	205.0	206	203	70
10	160-25-F	March 26	3.0	14	14.07	202.8	205	199	65
11	160-25-F	March 18	2.5	14	14.09	203.8	205	199	58
12	160-30-F	March 19	2.5	13	14.01	205.3	206	205	61
13	160-32-F	March 20	2.5	12.5	14.13	202.3	205	190	61
14	200-32-F	March 22	1.0	12	14.16	189.1	197	183	52
15	80-15-F	May 7	3.0	15.5	14.03	201.9	204	199	70
16	120-20-F	May 4	3.0	15	14.07	203.9	206	198	64
17	160-25-F	March 25	2.5	14	14.04	201.6	205	196	71
18	160-30-F	March 26	1.25	13	14.08	203.3	205	201	65
19	200-32-F	March 29	1.0	12.5	14.13	187.6	201	166	67
20	200-32-F	March 30	1.0	12.5	14.03	173.6	192	160	72

NOTE.—Throttle opening full in all tests.

## General Conditions.

Test No.	Laboratory symbol.	Kind of fuel.	Blender in briquet (per cent).	Fuel as fired (pounds).	Dry fuel fired (pounds).	Dry ash by analysis (pounds).	Combustible by analysis (pounds).	Dry fuel fired per hour (pounds).	Dry fuel per square foot of grate surface per hour (pounds).	Cinders collected in smoke box per hour (pounds).	Sparks discharged from stack per hour (pounds).
1	80-15-F	Coal	5.370	5,338	395	4,908	1,768	31.86	28	30	30
2	120-20-F	do	8.201	8,099	604	7,496	2,775	50.00	113	117	117
3	160-25-F	do	8.354	8,250	615	7,636	4,125	74.32	214	347	347
4	160-25-F	do	11,334	11,193	834	10,359	5,507	100.85	373	385	385
5	80-15-F	Square briquets	5.291	5,257	437	4,821	1,753	31.59	28	13	13
6	120-20-F	do	7.198	7,153	595	6,558	2,384	42.95	70	29	29
7	160-25-F	do	6.766	6,723	559	6,165	3,362	60.58	199	25	25
8	120-20-F	do	7.016	6,970	591	6,380	2,323	41.86	32	25	25
9	160-25-F	do	6.105	6,060	500	5,560	2,407	63.08	212	26	26
10	160-25-F	do	8.570	8,520	708	7,812	3,408	61.41	126	36	36
11	160-30-F	do	2,345	2,331	194	2,138	4,662	84.00	246	56	56
12	160-32-F	do	13,388	13,310	1,106	12,204	5,553	101.49	419	118	118
13	200-32-F	do	6.257	6,221	517	5,704	6,221	112.09	1,021	118	118
14	200-32-F	do	5.290	5,256	473	4,782	1,752	31.57	23	22	22
15	80-15-F	Round briquets	7.396	7,348	662	6,686	2,449	44.13	38	95	95
16	120-20-F	do	7.685	7,603	712	6,891	3,161	56.95	181	18	18
17	160-25-F	do	7.653	7,603	685	6,918	4,155	74.86	132	49	49
18	160-30-F	do	7.030	6,984	629	6,355	6,982	125.84	292	149	149
19	200-32-F	do	6.673	6,630	597	6,032	6,630	119.46	776	126	126

## Fuel.

Test No.	Laboratory symbol.	Water evaporated (pounds).		Equivalent evaporation (pounds).						Boiler horsepower.	Efficiency of boiler based on dry fuel (per cent).	Heat lost due to cinders and sparks (per cent).
		Per square foot of heating surface per hour.	Per pound of dry fuel.	Per hour.	Per square foot of heating surface per hour.	Per pound of fuel as fired.	Per pound of dry fuel.	Per pound of combustible.				
1	2	50	51	52	53	54	55	56	57	58	59	
1	80-15-F	6.15	8.07	17,392	7.50	9.72	9.84	10.63	504.1	63.7	2.55	
2	120-20-F	8.30	6.94	23,637	10.19	8.41	8.52	9.20	685.1	55.16	4.02	
3	160-25-F	10.97	6.28	31,193	13.45	7.61	7.70	8.32	904.2	49.85	6.32	
4	160-25-F	11.07	6.22	31,415	13.55	7.52	7.62	8.23	910.2	49.33	10.97	
5	160-30-F	13.07	5.42	37,073	15.98	6.54	6.62	7.16	1,074.6	42.86	10.30	
6	80-15-F	6.42	8.49	18,174	7.84	10.30	10.37	11.31	526.8	67.92	1.24	
7	120-20-F	8.64	8.40	24,492	10.56	10.21	10.27	11.20	709.9	67.27	2.71	
8	160-25-F	11.15	7.69	31,780	13.70	9.39	9.45	10.31	921.2	61.90	5.15	
9	120-20-F	8.66	8.65	24,544	10.58	10.49	10.57	11.54	711.4	69.86	2.26	
10	160-25-F	11.09	7.35	31,551	13.60	9.96	9.92	9.85	914.7	59.62	5.27	
11	160-25-F	11.26	7.66	32,116	13.85	9.37	9.44	10.28	930.9	61.57	3.55	
12	160-30-F	13.80	6.87	39,526	16.96	8.39	8.44	9.20	1,140.0	55.16	4.37	
13	160-32-F	14.89	6.48	42,485	18.32	7.93	7.98	8.70	1,231.5	52.11	6.97	
14	200-32-F	15.64	5.83	44,535	19.20	7.12	7.16	7.76	1,290.9	46.80	10.50	
15	80-15-F	6.37	8.43	18,015	7.77	10.22	10.28	11.30	522.2	67.50	1.76	
16	120-20-F	8.61	8.15	24,405	10.52	9.90	9.97	10.95	707.4	65.47	3.90	
17	160-25-F	10.90	8.00	31,005	13.37	9.74	9.81	10.78	898.7	64.42	2.70	
18	160-30-F	13.68	7.64	38,976	16.81	9.32	9.38	10.31	1,129.8	61.59	3.25	
19	200-32-F	15.73	6.23	44,520	19.23	6.34	6.34	7.02	1,292.5	41.91	4.67	
20	200-32-F	14.71	5.15	41,662	17.96	6.24	6.28	6.91	1,207.6	41.24	10.34	

## Boiler Performance.

These analyses were made on carefully selected samples from carload lots of the coal, and on briquets of several qualities. They show that the coal contains more fixed carbon and moisture and less volatile matter and ash than the briquets from the same coal. The calorific value per pound of dry fuel seems to be greater for the natural coal than for the briquets, notwithstanding the fact that the binder used in making

the briquets has a higher heating value than the coal itself.

Values representing the evaporative efficiency are presented as columns 50 to 59 in the boiler performance table. In Fig. 2 is shown the equivalent evaporation per pound of dry coal plotted against the rate of combustion. The figure presents a comparison under the same test conditions between the natural Lloydell coal and the same coal briquetted. It shows that a well-defined improvement in the evaporation per

Test No.	Laboratory symbol.	Speed.		Water.			Steam.		
		Revolutions per minute.	Miles per hour.	Feet per minute (piston).	Temperature of feed water (°F.).	Water delivered to injectors (pounds).	Water lost from injectors (pounds).	Water delivered to boiler and presumably evaporated (pounds).	Quality of steam (per cent).
1	80-15-F	80	18.89	173.1	54.8	43,940	670	43,270	98.47
2	120-20-F	120	28.34	259.6	46.7	58,736	399	58,337	98.60
3	160-25-F	160	37.78	346.2	47.9	81,510	0	81,510	98.28
4	160-25-F	160	37.78	346.2	50.4	51,920	0	51,920	98.45
5	160-30-F	160	37.78	346.2	49.9	61,316	0	61,316	98.40
6	80-15-F	80	18.89	173.1	53.8	45,201	30	45,171	98.46
7	120-20-F	120	28.34	259.6	51.7	60,832	78	60,754	98.42
8	160-25-F	160	37.78	346.2	45.9	52,323	0	52,323	98.47
9	120-20-F	120	38.34	259.6	53.0	61,098	150	60,948	98.42
10	160-25-F	160	37.78	346.2	47.4	78,000	0	78,000	98.45
11	160-25-F	160	37.78	346.2	48.9	66,039	42	65,997	98.48
12	160-30-F	160	37.78	346.2	46.0	16,173	0	16,173	98.52
13	160-32-F	160	37.78	346.2	43.8	87,261	0	87,261	98.46
14	200-32-F	200	47.23	432.8	45.0	36,716	0	36,716	98.51
15	80-15-F	80	18.89	173.1	54.1	46,088	1,300	44,788	98.49
16	120-20-F	120	28.34	259.6	51.8	60,536	0	60,536	98.49
17	160-25-F	160	37.78	346.2	47.7	63,953	0	63,953	98.53
18	160-30-F	160	37.78	346.2	48.753	58,753	0	58,753	98.54
19	200-32-F	200	47.23	432.8	50.4	36,875	0	36,875	98.54
20	200-32-F	200	47.23	432.8	49.4	34,473	0	34,473	98.58

## Speed, Water and Steam.

Test No.	Laboratory symbol.	Proximate analysis (per cent.).					Calorific value (B. t. u. per pound).			
		Fixed carbon.	Volatile matter.	Moisture.	Ash.	Sulphur (separately determined).	Dry coal.	Combustible.	Cinders.	Sparks.
1	2	31	32	33	34	35	36	37	38	39
1	80-15-F								12,216	8,453
2	120-20-F								11,167	11,167
3	160-25-F	72.03	19.37	1.24	7.36	1.20	14,918	16,119	10,385	12,097
4	160-25-F								12,685	11,618
5	160-30-F								11,019	11,737
6	80-15-F								10,363	9,912
7	120-20-F	69.95	21.16	63	8.26	1.35	14,745	16,082	10,080	8,524
8	160-25-F								11,618	9,462
9	120-20-F	69.43	21.50	65	8.42	1.58	14,612	15,955	10,023	9,741
10	160-25-F								11,713	8,901
11	160-25-F								9,157	9,781
12	160-30-F	69.88	21.28	58	8.26	1.28	14,777	16,116	7,370	9,899
13	160-32-F								11,523	11,048
14	200-32-F								8,434	8,836
15	80-15-F								11,003	9,178
16	120-20-F								10,296	8,574
17	160-25-F								10,022	9,785
18	160-30-F	68.19	22.21	.65	8.95	1.81	14,708	16,164	11,761	8,816
19	200-32-F								11,378	9,941
20	200-32-T								11,378	10,022

but with the same coal briquetted the evaporation is more than 19 lbs.

The following table, derived from Fig. 4, gives a comparison of the different fuels at equal rates of evaporation:

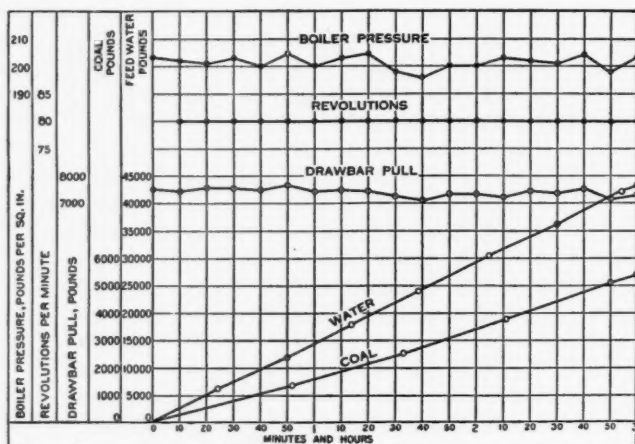
Evap. per sq. ft. heating surface per hr.	8	10	12	14	16
Equivalent evaporation per lb. of fuel:					
Natural Lloydell coal	9.5	8.8	8.0	7.3	6.6
Briquetted Lloydell coal	10.7	10.2	9.7	9.2	8.7

The ultimate measure of locomotive efficiency is expressed, of course, in terms of coal per dynamometer horsepower hour. This value plotted against dynamometer horsepower is given in Fig. 5, which shows that whatever may be the power de-

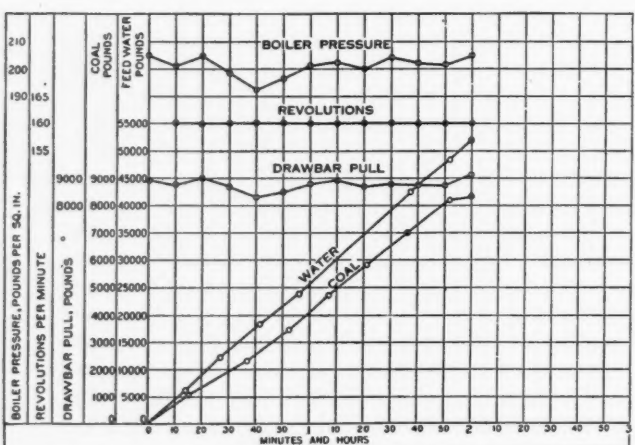
veloped the briquets give the greater efficiency, but that when the power is extremely low or extremely high the difference is small. At the point of maximum efficiency the difference amounts to nearly 35 per cent. It should be remembered, however, in dealing with dynamometer horsepower that several variable factors, such as machine friction and engine efficiency, are introduced into the equation; and that the only true comparison to disclose the relative values of different fuels is that which is based on boiler performance alone.

#### CINDERS.

In Fig. 6 the weight of cinders collected in the smoke box is shown for different rates of combustion. There appears to



Graphic Log., Test 1.



Graphic Log., Test 4.

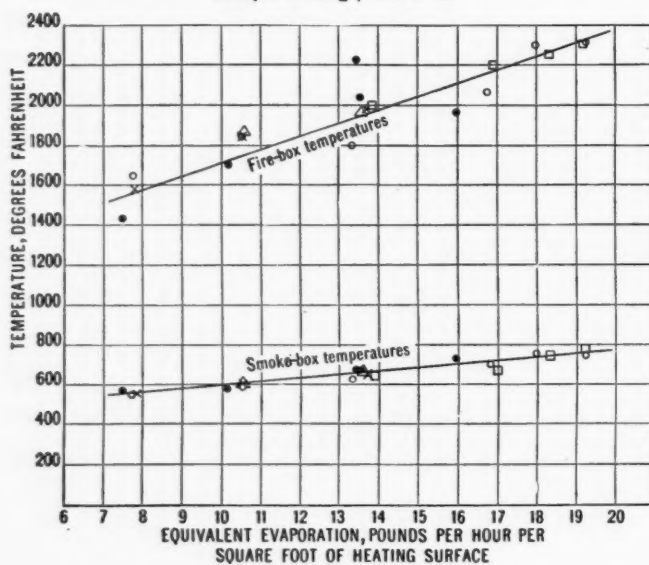


Fig. 1.

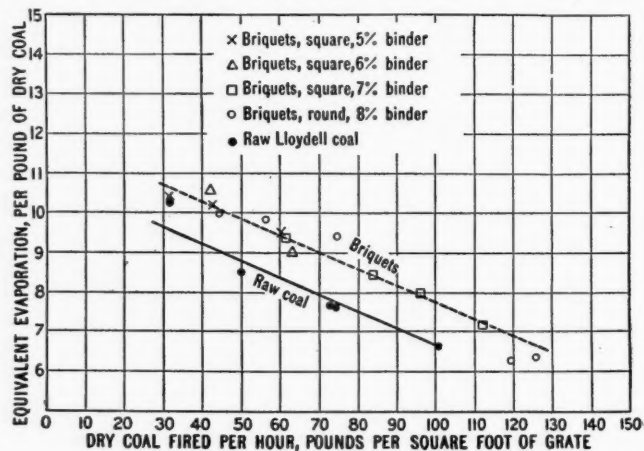


Fig. 2.

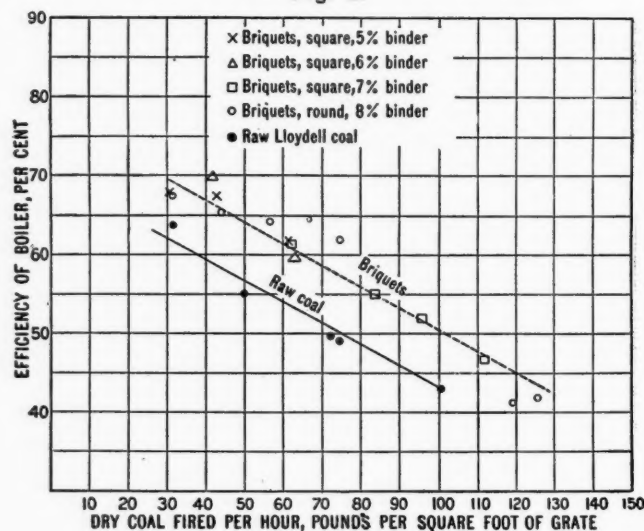


Fig. 3.

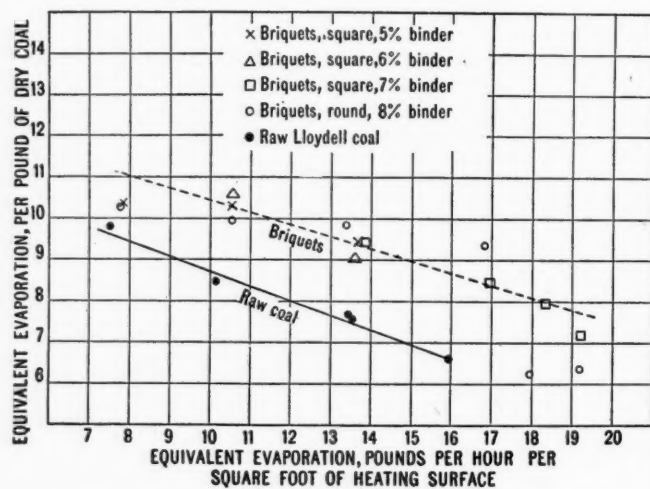


Fig. 4.



be little or no difference in the results obtained from the natural coal and the briquetted coal. The sparks from the stack, when the locomotive was fired with briquets, were in the form of flakes of a size considerably larger than those discharged when coal was fired.

The calorific value of the cinders collected in the smoke box and the sparks discharged from the stack is, in general, higher for the natural coal than for the briquetted coal. That is, the heat loss due to the sparks and cinders is greater for the natural coal, though the quantities in pounds of cinders may be the same.

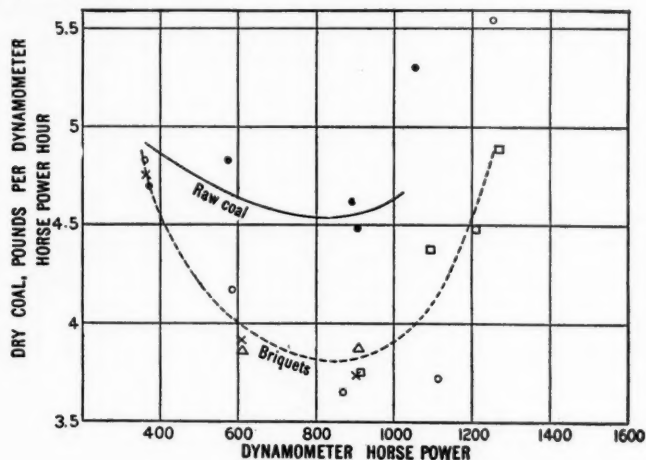


Fig. 5.

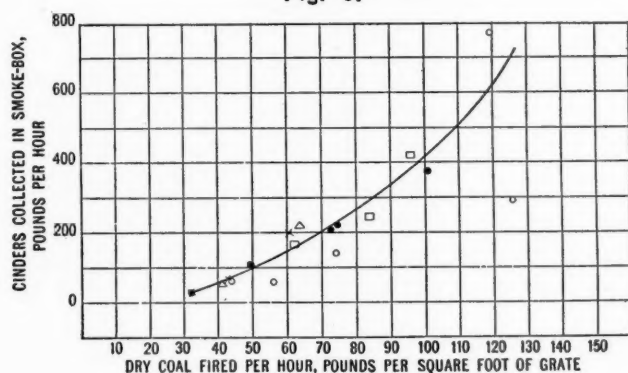


Fig. 6.

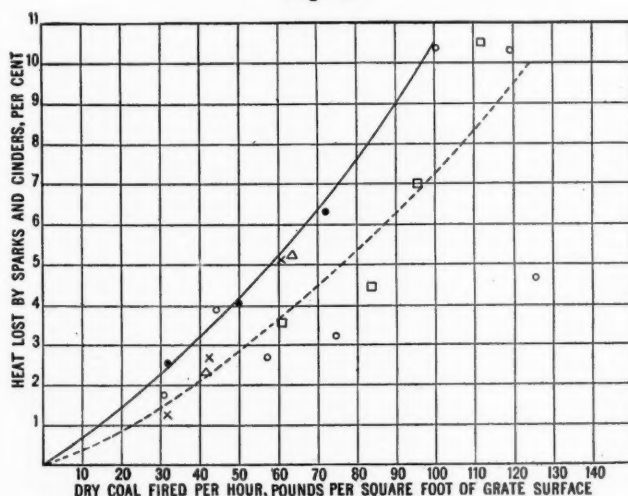


Fig. 7.

The amount of heat lost in the form of cinders and sparks, expressed as a percentage of the total heat supplied, is shown graphically by Fig. 7, in which the solid line represents the average cinder and spark loss for raw Lloydell coal at varying rates of combustion, and the broken line the same loss for the briquetted Lloydell coal. The points representing the former lie extremely close to the average line, but those representing the latter do not fall in such close alignment. It is a fact

worthy of note, however, that those points which represent tests with briquets having the larger percentage of binder generally fall below the average line, whereas those for the smaller percentage of binder generally fall above the average line. The percentage of binder generally falls above the average line. The curve therefore shows that (a) the loss due to cinders and sparks is greater when raw coal is used than when briquets are used, and the difference increases as the rate of evaporation increases; (b) the loss due to cinders and sparks decreases slightly as the percentage of binder used in the briquets is increased.

## SMOKE.

The density of the smoke from the locomotive was compared with the Ringelmann charts. These charts are usually designated as follows: No. 0, no smoke; No. 1, light gray; No. 2, darker gray; No. 3, very dark gray; No. 4, black; No. 5, very black. The gradations in shade corresponding to the above scale of densities are shown in the illustration herewith.

Smoke records were made at 10-min. intervals, 20 observations, approximately three seconds apart, being made the basis for each record. It was assumed that observations made for one minute at the beginning of each 10-min. interval would represent the average conditions for the whole interval. To reduce the number of observations to 10 for each 10 minutes every other reading was taken.

In order to present these smoke indications in better form for comparison, average values have been calculated, and the results are given in the subjoined table.

Test No.	Laboratory symbol.	Percentage of capacity of boiler, a	Density of smoke, b	Kind of fuel.
1	80-15-F	43.5	1.1	Coal.
6	80-15-F	45.4	.3	Square briquets, 5 per cent binder.
15	80-15-F	45.0	.5	Round briquets, 8 per cent binder.
2	120-20-F	59.1	1.2	Coal.
7	120-20-F	61.2	.4	Square briquets, 5 per cent binder.
9	120-20-F	61.4	.3	Square briquets, 6 per cent binder.
16	120-20-F	61.0	.8	Round briquets, 8 per cent binder.
3	160-25-F	78.0	1.8	Coal.
4	160-25-F	78.5	1.6	Do.
8	160-25-F	79.5	.4	Square briquets, 5 per cent binder.
10	160-25-F	78.9	1.0	Square briquets, 6 per cent binder.
11	160-25-F	80.3	.4	Square briquets, 7 per cent binder.
17	160-25-F	77.5	.7	Round briquets, 8 per cent binder.
5	160-36-F	92.7	2.1	Coal.
18	160-36-F	97.3	1.8	Round briquets, 8 per cent binder.
13	160-32-F	106.2	1.4	Square briquets, 7 per cent binder.
14	200-32-F	111.3	2.3	Do.
19	200-32-F	111.5	4.1	Round briquets, 8 per cent binder.
20	200-32-F	104.0	4.2	Do.

a Based on 40,000 pounds equivalent evaporation per hour.

b Average number Ringelmann scale.

## Results of Smoke Observations.

A careful examination of this table shows that for a given boiler capacity more smoke is made when raw coal is fired than when briquets are fired. Thus, on comparing tests 3 and 4 with tests 8, 10, 11 and 17, we find the average density of smoke for raw coal to be 1.7, whereas for briquets it is but 0.62. Test 20 with briquets shows very black smoke, but in this test the boiler was forced to an evaporation far beyond that found possible with natural coal. The smoke-box gases show over 7 per cent. of carbon monoxide and less than 1 per cent. of oxygen, indicating very incomplete combustion. In Fig. 8 the smoke density is plotted against boiler capacity, and average lines are drawn through points representing tests with raw coal and briquets with 8, 7 and 5 per cent. of binder. As there are but two points representing tests with briquets having 7 per cent. binder, and as their position seems to be contradicted by the position of the other points, no line has been drawn through them. The curves show that the smoke density is nearly constant for all capacities under 90 per cent. of full load, but that for capacities beyond this point the density increases rapidly. It appears that for all tests with briquets the density of the smoke is less than for corresponding tests with raw coal; but more smoke is produced with briquets having 8 per cent. binder than with those having 5, 6 or 7 per cent. Whether this fact is to be explained by the varying amounts of binder used or by the difference in size and shape is a question. However, as the binding material employed consists largely of volatile matter, it is reasonable to suppose

that the varying amounts used in the several briquets cause the varying density of the smoke shown in Fig. 8.

#### SMOKE DENSITY IN INTERMITTENT RUNNING.

At the end of test 13, with the locomotive standing, the blower was put on, and after two minutes the smoke cleared. Immediately after the close of test 14, with a very heavy fire, the engine was again started at a slow speed and with partly open throttle. With these conditions of running, the smoke cleared entirely after 18 minutes. These conditions are not dissimilar to the intermittent operation to which a locomotive is subjected as it enters a terminal, and the results show the degree of smoke control which the use of briquets makes possible under such adverse conditions.

#### BEHAVIOR OF COAL AND BRIQUETS DURING COMBUSTION.

Briquets of both small and large size were fired with the ordinary shovel and were handled in much the same manner as coal. In all tests they were fired alone without mixing with coal. It was not necessary to break the briquets in order to handle them readily with the ordinary scoop shovel, and the unbroken briquets burned freely and completely. They disintegrated slowly from the heat of the flame and became more, or less porous as they swelled and opened under the action of the heat.

In the process of starting a fire with briquets no difficulty was experienced, the ordinary blower arrangements at the engine house being sufficient. The natural coal was finely divided when fired and did not form so open a mass in the fire box as the briquets. Much of the finer portion was drawn, unburned, through the tubes by the force of the draft.

#### EFFECT OF HANDLING AND WEATHERING ON BRIQUETS.

To observe the effect on briquets of exposure to the weather, a number of the round and square briquets were placed on the roof of the testing plant. After four months of exposure for the round and three months for the square briquets, no

were handled a third time in taking them to the firing platform of the test locomotive. After these three handlings they were still in good condition, very few were broken, and the amount of dust and small particles was practically negligible.

#### CONCLUSIONS.

The results of the tests justify the following conclusions:

- The evaporation per pound of fuel is greater for the briquetted Lloydell coal than for the same coal in its natural state. This advantage is maintained at all rates of evaporation.
- The capacity of the boiler is considerably increased by the use of briquetted coal.
- Briquetting appears to have little effect in reducing the quantity of cinders and sparks; the calorific value of these, however, is not so high in the briquetted as in the natural fuel.
- The density of the smoke with the briquetted coal is much less than with the natural coal.

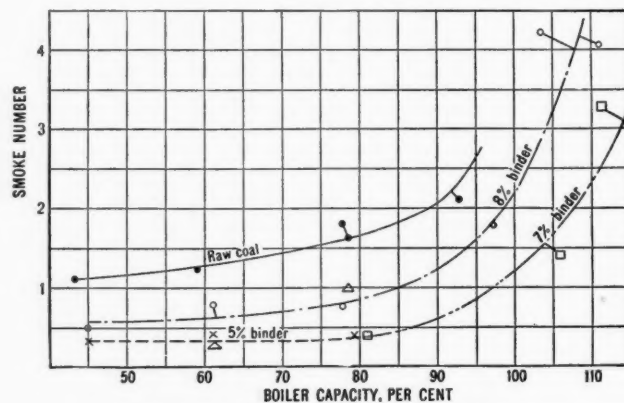
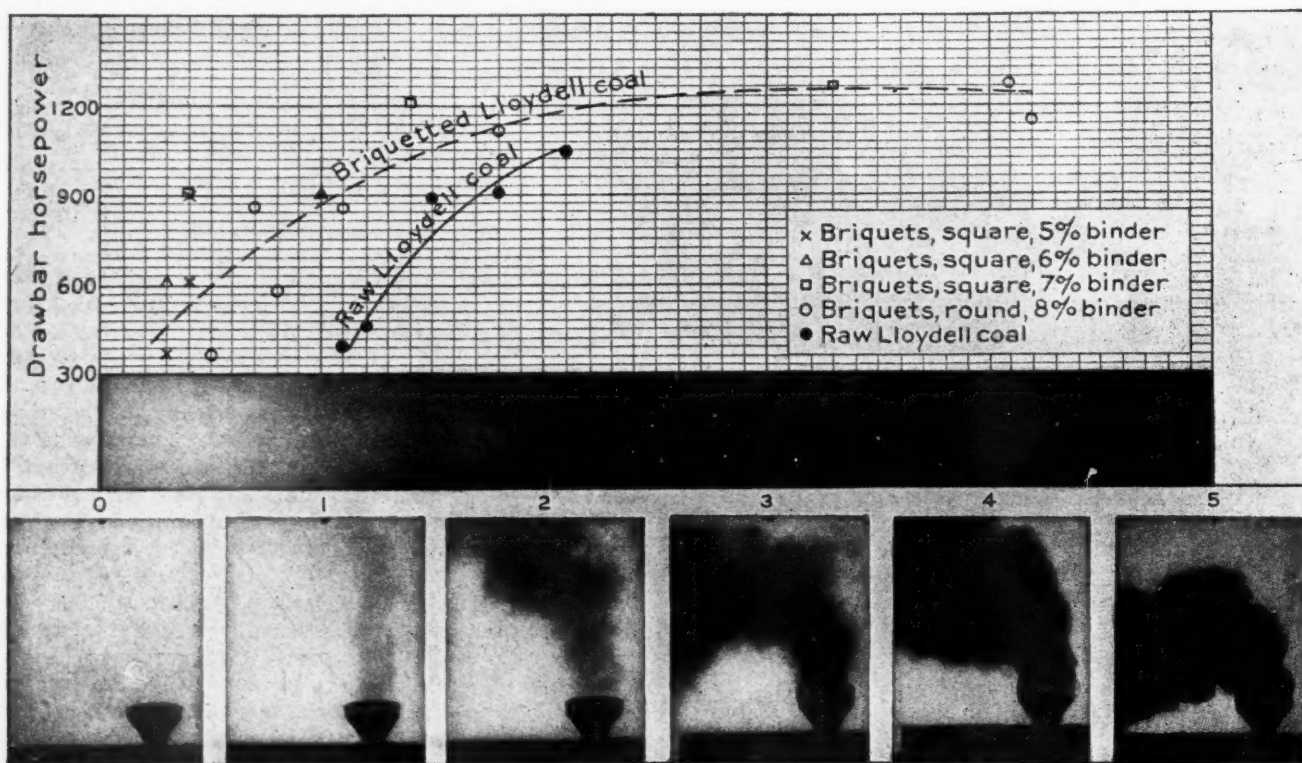


Fig. 8.



Ringelmann Smoke Chart and Diagram of Drawbar Pull.

change whatever from their original condition was noticed. They appeared to be entirely impervious to moisture and were still firm and hard.

The briquets were little affected by handling. They were loaded at St. Louis in open gondola cars and shipped to Altoona, where they were unloaded by hand and stacked. They

(e) The percentage of binder in the briquet has little influence on smoke density.

(f) The percentage of binder for the range tested appears to have little or no influence on the evaporative efficiency.

(g) The expense of briquetting under the conditions of the experiments adds about \$1 per ton to the price of the fuel, an



amount which does not seem to be warranted by the resulting increase in evaporative efficiency.

(h) With careful firing, briquets can be used at terminals with a considerable decrease in smoke.

(i) The briquets appear to withstand well exposure to the weather, and suffer little deterioration from handling.

#### VALUATION OF RAILWAYS IN MINNESOTA.

The Railroad Commission of Minnesota made public on January 25 the results of its valuation of the railways in that state. This is in many ways the most exhaustive physical valuation of railways ever made. It includes the properties of 19 carrying railways, having in Minnesota a line mileage of 7,578 miles, and a track mileage of 10,334 miles, and of 6 switching or terminal railways, having a line mileage of 19 miles and a track mileage of 104 miles. The total miles of line appraised was 7,597, and of all tracks, 10,438. The work was begun January 26, 1906, and took almost three years.

The carrying roads whose properties were appraised are the following: The Chicago, Burlington & Quincy, the Chicago, Great Western, the Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Chicago, Rock Island & Pacific, the Chicago, St. Paul, Minneapolis & Omaha, the Duluth & Iron Range, the Duluth, Missabe & Northern, the Duluth & Northeastern, the Duluth & Northern Minnesota, the Great Northern, the Mason City & Fort Dodge, the Minnesota & International, the Minneapolis, St. Paul & Sault Ste. Marie, the Minneapolis & St. Louis, the Northern Pacific, the Wisconsin Central, the Minnesota & Pacific, and the Illinois Central.

The switching, or terminal, roads whose properties were appraised are the following: The Duluth Union Depot & Transfer, the Minnesota Transfer, the Minneapolis Eastern, the Minneapolis Union, the Minneapolis Western, and the St. Paul Union Depot.

The method used in making the valuation was fully described in *The Railway Age* of December 20, 1907, page 877. It was in brief as follows: At a meeting of the commission and its engineers with officers of the railways on January 26, 1906, it was agreed to take the prices prevailing in 1905 as unit prices of materials for the five-year period, ending June 30, 1907. Using these prices as a basis, the railways submitted estimates, on blanks furnished by the commission, of the cost of reproduction, new, of all the elements of their physical properties, as of June 30, 1906. The commission's engineers, headed by Dwight C. Morgan, Chief Engineer, then went over all the lines, through all the shops, etc., of the roads, and checked the figures of the railways, making the commission's valuation as of June 30, 1907.

The commission sought to find:

(1) "The cost of acquiring presently the lands and other real estate owned and occupied by railways for railway purposes, also the cost of reproducing new the physical elements entering into the construction of the lines, with all appurtenances; assuming that the location, environments and conditions affecting each railway and governing such costs of acquirement and reproduction are as they exist to-day."

(2) "To establish the depreciation in value of the physical properties due to the effect of the elements and to the wear and tear by use, to be determined from an actual examination of the railways, thus enabling a personal knowledge of the standards of construction and maintenance and of the conditions affecting each property."

The results obtained are referred to as (1) "Cost of reproduction" and (2) "Present value of the physical properties."

#### COST OF REPRODUCTION OF RAILWAY LAND.

The most difficult problem encountered was that of fixing a proper valuation upon land used for right-of-way, yards and terminals. Dwight C. Morgan, Chief Engineer, discusses this vitally important subject at length in his report to the commission, from which the following extracts are taken:

"In reaching a determination of the true value of lands

adjacent to the railways from which to consider the cost of reproducing the right-of-way there has been taken into consideration more than 55,000 *bona fide* sales of property, representing more than 1,300,000 acres of land and involving considerations approximating \$100,000,000 which, supplemented with the opinions of disinterested parties and with personal observations along each line of railway in the state, formed the basis for establishing the true value of lands abutting the right-of-way of the railway companies. The purchase of lands for a right-of-way requires the consideration of two elements: first, the fair value of the land taken, and second, the damages to the residue in consequence of a part of the tract having been taken for railway purposes.

"The variety of conditions and circumstances which attach to each individual purchase of right-of-way, if considered separately, could but lead to a maze of uncertainty because the actual cost of the individual parcels acquired, ranges between a nominal amount and more than ten times the true value of adjacent lands.

"It is, therefore, proper to state that in all of the work relating to the value of lands and to the appraisal in its entirety, the application of rules for the determination of reproduction costs have not been adhered to so rigidly as to preclude the rejection of results which it could be seen were plainly and palpably inconsistent and at variance with either professional intelligence or common sense. Every means which seemed to furnish reliable information has been availed of, and *bona fide* sales of lands to railways covering the more recently constructed lines consisting of more than 7,000 acres located in different parts of the state for which more than \$4,200,000 was expended in its acquirement, have been employed in determining the relation between the average normal value of lands and their average actual cost to the railways.

"Careful and full consideration of all information made available for establishing the value of the right-of-way owned and used by the railways for railway purposes, led to the conclusion that in the state at large, exclusive of the three terminals of St. Paul, Minneapolis and Duluth, a multiple of 3 applied to the true value or normal value of lands as obtained from the transfers, would in general satisfy the conditions. The details of the acquirement of the right-of-way of the Illinois Central between Lyle and Glenville, in the counties of Mower and Freeborn, show that, of 35 per cent. of the right-of-way acquired by condemnation proceedings, the company paid about  $4\frac{1}{2}$  times the average true value of the lands, and of the 65 per cent. purchased by agreement the price paid was but 1.7 times the average true value of the lands. From the facts gathered in this and other instances it may be accepted as a general rule that where right-of-way is obtained by condemnation, the price paid per acre is usually more than that of lands purchased by agreement.

#### "SALES METHOD" USED FOR TERMINALS.

"The basis for the determination of the value of lands in St. Paul, Minneapolis and Duluth was the 'sales method' familiar to all those who have investigated the subject of taxation and real estate values. Each sale is accompanied by two values—the selling price and the assessed value from which the ratio of true to assessed value is obtained. The problem of the value of real estate in these cities was worked out on the general formula: 'As the assessed value of lands sold is to the consideration paid, so is the assessed value of the real estate for the entire assessment district to the full value thereof.'

"During the past six years the general transactions in real estate in St. Paul, Minneapolis and Duluth have been extensive and during the same period the purchase of terminal property by railways in these cities aggregate more than 320 acres, costing the companies nearly \$3,000,000. How much the railways paid for these properties in excess of their normal value, was determined from the relation their assessed value and sale price bore to the assessed value and sale price of all other

lands transferred in the respective cities, that were not acquired for railway purposes.

"The following example will illustrate the practical workings of the principle upon which terminal property values were established: An important line owning terminals in St. Paul recently purchased 44.67 acres of land within the city for \$54,047.75; this same tract was at the time of purchase assessed at \$18,135, which from the records of upwards of 10,000 sales is normally 60 per cent. of its true value; therefore, its probable sale price, under normal conditions, and for purposes other than railway use, would have been approximately \$30,225.

"During the period referred to, the railways paid for the property acquired by them, over and above its normal value, an amount sufficient to justify the use of the following multiples: St. Paul, one and three-fourths; Minneapolis, one and three-fifths, and Duluth, one and one-fourth; which, when applied to the normal value of the lands as established from contiguous and surrounding property, formed the basis for measuring the cost of reproducing the existing terminals.

"In the development of these factors, it was fortunately true that the data available included the cost of the newly-

sought to determine what it would cost to reproduce these terminal properties in the possession of its present owners as measured by the value of contiguous and surrounding property, primarily without reference to present use, its indispensability for the purposes of transportation, or to strategy of location which, when pre-supposed, must tend to confuse the judgment as between reproduction cost as land and what its value may be regarded because it is utilized for a particular purpose. Cost of reproduction and value as a utility, have no necessary or logical relation, and the fact that the terminal lands or the properties in part or in whole are not actually to be reproduced, or the fact that it might not be possible at all to reproduce them or their equivalents, probably renders their present possession invaluable not only to the owners, but to the communities dependent upon the facilities afforded for industrial activity and commercial supremacy. It is not clear, however, that these elements, which can very conveniently be made the basis for extremely high figures of value, should either merit support or find justification in an estimate purporting to represent reproduction cost.

"As further evidence of the inequalities which spring from

TABLE I.—MILEAGE, CAPITALIZATION AND VALUATION OF MINNESOTA RAILWAYS.

Railways.	Mileage in Minnesota.	Minnesota share capital.	Railways' estimate cost reproduc- tion, 1906.	Commission's estimates				Capital per mile in Minn.	Est. cost reproduc- tion per mile	
				"A"		"B"			Railway's, 1906.	Com's. estimate "A," 1907.
				Cost reproduc- tion, 1907.	Present value, '07.	Cost reproduc- tion, 1907.	Present value, '07.			
Chicago, Burlington & Quincy..	23.5	\$757,242	\$2,957,221	\$2,726,670	\$2,405,988	\$2,451,931	\$2,131,250	\$32,278	\$126,054	\$116,226
Chicago Great Western .....	118	16,743,875	17,639,880	7,769,914	6,714,147	6,595,116	5,539,349	142,392	150,012	66,076
Chic., Mil. & St. Paul .....	1,202	43,371,044	54,888,175	54,591,393	47,459,752	46,459,470	39,327,829	36,083	45,665	45,418
Chicago & North Western .....	651	25,068,954	20,914,139	21,214,978	17,463,934	18,541,144	14,790,100	38,492	32,113	32,574
Chic., Rock Island & Pacific .....	236	12,095,605	11,280,105	8,716,215	7,779,600	7,493,711	6,577,096	51,207	47,755	36,900
Chic., St. Paul, Minn. & Omaha ..	431	16,717,540	29,217,691	26,778,560	22,838,120	22,553,406	18,612,968	38,777	67,772	62,113
Duluth & Iron Range .....	241	14,232,000	27,267,140	20,564,552	17,771,796	19,226,745	16,433,990	59,095	113,221	85,390
Duluth, Missabe & Northern .....	142	13,155,500	24,031,984	23,087,672	20,909,116	22,328,569	20,150,013	92,565	169,096	162,452
Duluth & Northern Eastern .....	63	500,000	665,582	859,865	711,737	791,496	643,368	7,874	10,481	13,541
Duluth & Northern Minnesota .....	35	200,000	968,039	880,008	675,956	836,477	632,425	5,714	27,658	25,143
Great Northern .....	2,050	78,268,492	134,823,938	107,074,102	94,415,343	95,406,976	82,748,216	38,181	65,770	52,233
Mason City & Fort Dodge .....	27	3,237,425	1,625,205	772,072	622,941	690,926	541,795	118,587	59,531	28,281
Minnesota & International .....	174	2,645,000	4,944,057	3,966,309	3,409,461	3,709,605	3,152,757	15,160	28,338	22,733
Soo. ....	540	18,255,913	20,992,511	21,990,682	19,575,254	19,392,305	16,976,876	33,834	38,906	40,756
Minneapolis & St. Louis .....	378	20,884,937	21,845,196	16,622,245	14,276,189	14,185,150	11,839,093	55,184	57,721	43,921
Northern Pacific .....	967	55,898,480	86,817,468	69,397,955	61,099,563	60,679,409	52,381,018	57,801	89,772	71,760
Wisconsin Central .....	24	1,235,380	4,238,241	2,780,323	2,455,906	2,201,481	1,877,064	52,389	179,586	117,810
Western Minnesota & Pacific ..	244	10,539,656	11,959,545	6,561,652	5,645,689	5,763,945	4,847,982	43,190	49,008	26,889
Illinois Central .....	30	1,172,648	810,544	944,302	800,845	798,458	655,001	38,868	27,164	31,300
Duluth, Union Depot & Terminal ..	0.4	.....	1,018,170	910,698	817,541	821,545	728,388	.....	2,558,217	2,288,185
Minneapolis Eastern .....	0.9	.....	969,164	897,460	847,488	639,268	589,296	.....	1,023,404	947,688
Minneapolis Union .....	3	.....	7,773,750	4,321,250	4,021,728	3,364,425	3,064,904	.....	2,955,798	1,643,061
Minneapolis Western .....	2	.....	1,745,899	1,078,831	966,210	849,883	737,262	.....	1,033,076	638,362
St. Paul Union Depot .....	0.6	.....	5,495,150	4,354,202	4,184,311	2,847,343	2,677,453	.....	9,812,767	7,775,360
Minnesota Transfer .....	12	.....	5,777,987	2,873,283	2,591,546	2,332,762	2,051,025	.....	462,239	229,863

NOTE.—Average capitalization of railways in Minnesota (except the six switching roads, last mentioned in table), \$44,206 per mile; average cost of reproduction of 19 carrying roads, as estimated by themselves, 1906, \$65,909 per mile; Commission's estimate "A" cost of reproduction of carrying roads, 1907, \$52,430 per mile; Commission's estimate "A," present value, \$45,799 per mile; Commission's estimate "B," cost of reproduction of carrying roads, 1907, \$46,202 per mile; estimate "B," present value, \$39,571 per mile; average valuation placed on six switching roads (last mentioned) by roads themselves, \$1,216,152 per mile; Commission's estimate "A," cost of reproduction of switching roads, 1907, \$770,933 per mile; estimate "A," present value, \$717,160 per mile; Commission's estimate "B," cost of reproduction of switching roads, \$579,718 per mile; estimate "B," present value, switching roads, \$525,945 per mile.

acquired terminals of three railway companies; two entering St. Paul and one entering Duluth.

"It may be asserted that the 'sales method' does not represent real value. I cannot presume to try to settle a question so replete with human mystery; it is sufficient answer here that if it does not represent real value, then the multiples used for the determination of right-of-way values must be correspondingly modified so that in the end the same result for right-of-way values, as well as for terminal values, ought to obtain.

"The true value and the right-of-way value of lands returned in the reports of the railways for the present appraisal of their properties is based largely upon opinion. In the cities of St. Paul, Minneapolis and Duluth, commissioners were selected by the railways to return jointly for the several companies their estimates of the value of the terminal lands.

"If the problem in hand contemplated the actual taking over of these properties, there might possibly be no alternative but to adhere to the principle that value depends upon its power to satisfy human want, in which event no economic principle can prevail that is apart from man's estimate of the want satisfying power. We are not, however, confronted by the conditions which such a procedure would impose, but it is

individual opinion of the value of lands for railway purposes, in the reports of the railways in this appraisal inconsistencies are not infrequent; sometimes the values are not high enough, more often they are too high. The station of Fridley, in Anoka county, situated on the Northern Pacific and the Great Northern, about 10 miles north of Minneapolis, is not incorporated, it has no business houses and is distinctly an agricultural district. The right-of-way of the Northern Pacific and the Great Northern adjoin and are parallel; the main tracks are about 16 feet apart and a small shed used jointly as a depot serves the patrons of the roads. In estimating the cost of reproducing its right-of-way within the station limits, the Northern Pacific made no distinction as between the value of its right-of-way in the immediate vicinity of Fridley and that situated within several miles north and south of the station, because no local conditions prevailed which justified a right-of-way value higher than that applicable to occupancy through the agricultural region adjoining. The Great Northern entertained a different opinion; and for a class of property which the Northern Pacific estimated the cost of reproduction at \$600 per acre the Great Northern estimated at \$3,000 per acre.

"In acquiring the property for its entrance into St. Paul in 1901-2, the Burlington, Cedar Rapids & Northern, now the



Chicago, Rock Island & Pacific, purchased a total of 45.55 acres for \$137,299. The estimated cost of reproducing this property to-day as determined from the sales method using the established multiple for St. Paul of one and three-fourths is \$255,199. The commissioners appointed by the railways placed a value on this same property amounting to \$978,263.

"The estimates prepared under my direction and the returns made by the railways, in some instances approximate very closely and in other instances disclose wide variations in the comparative estimates of cost, and by far the largest single factor responsible for this difference relates to the lands for right-of-way and terminals."

#### TWO ESTIMATES OF COST OF REPRODUCTION MADE.

The views expressed by Mr. Morgan are shared by the Commission. Owing to the differences of opinion that developed between the Commission and the railways as to the proper valuation to be placed on land, the Commission decided to prepare two sets of tables, Estimates "A" and "B." In Estimate "A" the valuation upon land used by railways is based upon what the Commission's investigations show it probably now would cost the roads to acquire the land for railway purposes; in Estimate "B" the valuation upon land is based upon what it probably would now cost—assuming it were not being used for railway purposes—to acquire it for other than railway purposes. Table I, presented herewith, entitled, "Mileage, Capitalization and Valuation of Minnesota Railways," contains, among other data, the railways' estimates of the cost of reproduction of their properties, and the Commission's estimates "A" and "B" of cost of reproduction.

The difference between the Commission's estimates are due entirely to its having made different allowances for the cost of reproduction of land used for right-of-way and terminals. Estimate "B" is the one that the Commission regards as correct. Table II, entitled "Commission's Estimates of Cost of Reproduction of Land for Railway Purposes," gives the two estimates of land values, and the ratios between them for the various roads.

TABLE II.—Commission's Estimates of Cost of Reproduction of Land Used for Railway Purposes.

Railways.	Estimates		Av. ratio of estimates "A" to "B"
	"A."	"B."	
Chic., Burl. & Quincy.....	\$770,586.87	\$567,165.17	1.359
Chicago Great Western.....	1,841,975.58	1,006,676.50	1.829
Chic., Mil. & St. Paul.....	11,563,590.19	6,355,933.84	1.819
Chic. & North Western.....	2,470,078.37	1,053,811.51	2.343
Chic., Rock Isl. & Pacific..	1,466,031.22	658,962.88	2.224
Chic., St. P., Minn. & O....	7,275,263.37	4,245,392.75	1.713
Dul. & Iron Range.....	1,258,388.03	625,556.25	2.011
Dul., Missabe & Nor.....	842,419.93	547,653.34	1.538
Duluth & Northeastern...	18,000.00	6,000.00	3.000
Duluth & Nor. Minn.....	13,094.10	4,364.70	3.000
Duluth, Union Dep. & Tr.	379,422.21	303,537.74	1.250
Great Northern.....	13,918,819.32	7,479,957.80	1.861
Mason City & Fort Dodge..	73,888.26	25,707.42	2.874
Minnesota Transfer.....	919,791.06	494,315.20	1.860
Minnesota & International.	117,960.45	39,586.15	2.979
Minneapolis Eastern.....	593,834.89	371,146.82	1.599
M., St. Paul & S. Ste. M....	2,974,028.98	1,589,445.92	1.871
Minneapolis & St. Louis...	3,398,754.84	1,872,522.04	1.815
Minneapolis Union.....	2,216,103.02	1,385,064.43	1.599
Minneapolis Western.....	521,324.85	326,130.46	1.599
Northern Pacific.....	15,385,078.47	9,498,099.27	1.619
St. Paul Union Depot.....	3,069,563.95	1,754,036.57	1.749
Wisconsin Central.....	1,127,785.85	659,372.31	1.710
Western Minnesota & Pac...	836,537.23	342,191.50	2.444
Illinois Central.....	149,436.66	62,628.97	2.386
Total.....	\$73,201,757.70	\$41,275,259.54	1.7735

Mr. Morgan describes fully the examination of the physical properties by the Commission's engineers. (See *The Railway Age*, December 20, 1907, page 877.) The following extracts are taken from the parts of his report in which he discusses "units of cost," "adaptation and solidification or roadbed," "contingencies and interest during construction."

#### UNITS OF COST.

"The units of cost, which are vital to the work, are the result of much research. The units of cost used by the railways in their reports were compiled in detail and furnished not only very instructive data, but were very interesting in the range of prices put upon identical items upon which there should be no very material differences.

"For example: The price of steel rails varied from \$20 to \$31.50 per ton, f.o.b. St. Paul or Duluth.

"Bridge steel of the same class ranged from 2½ c. to 4½ c. per lb.

"Locomotives of the same type and weight varied from 6¼ c. to 12¼ c. per lb.

"Engineering, superintendence and legal expenses, between 1½ per cent. and 15 per cent.

"Contingencies, between 5 per cent. and 50 per cent.

"Interest during construction between 1 per cent. and 12 per cent.

"It became an impossible task to attempt to reconcile some of these differences, but from the extensive data made available it was possible to reach conclusions and establish units of cost that it is believed are fairly representative.

"Regarding other items entering into the estimates, it was wholly impracticable to use unit constants, and in respect to these each property was considered separately. Several important subjects in this class may be mentioned as, the cost of grading, which varies with the character of the work, ranging on different sections of the same line and for different lines, between 17 cents and 36 cents per cubic yard for earth work; solid rock, between \$1 and \$1.50 per cubic yard, according to its character which in some localities is ordinary lime rock, while in other localities a very hard basaltic rock is encountered; the cost of clearing and grubbing in heavily timbered regions cannot be made the basis for that class of work in the sparsely timbered sections of the state.

#### ADAPTATION AND SOLIDIFICATION OF ROADBED.

"Adaptation and solidification of roadbed was considered separately by but one railway. In most instances, however, the prices employed by the railways are regarded as sufficiently high in themselves to give recognition to this element of cost.

"It appears to be a well established fact that in constructing a railway the engineer is seldom, if ever, permitted to fully complete his work before the actual operation of the line is undertaken. The investment in the project is large and it is important to start an income account just as soon as the construction work has advanced sufficiently to permit it; therefore, upon the opening of a new line for the purposes of transportation it cannot be assumed that with the inauguration of service the property represents a finished product.

"Adaptation in its application to the problem of reproduction cost is the adjustment of the physical line to its environments and purposes. Solidification of roadbed is its settlement to a stable condition.

"Cost of reproduction, as given interpretation in this appraisal, has been taken to imply that the property to be reproduced must be considered in the light of its perfectness, of its stability and its fitness as a working tool.

"If, in preparing such an estimate, fair units of cost are applied to the elements entering into the construction of the line up to the time it becomes available for use, it is apparent that the already established line has, in addition thereto, the expenditures of seasoning, which it is impossible to incorporate in the accounts of any newly constructed railway. Bearing in mind that equivalent conditions are sought, possible only in the progress of time, it seemed desirable to consider this element of cost separately because it avoids disturbing normal construction costs and provides for the policing of the line until such time as, it may be reasonably regarded, the property is unaffected by the deficiencies attributable to newness.

#### CONTINGENCIES.

"In preparing estimates for the construction of a projected line of railway it is customary for engineers to add a percentage to the estimated cost to cover unforeseen conditions that develop in the execution of the work.

"Engineers differ as to the percentage to be added to estimates of cost. In many cases they are governed by their own experiences, but the usual amount added for projected lines is 10 per cent. of the estimated cost.

"The estimates I have prepared of the railways of Minnesota are not for projected lines of railway, but for the reproduction of existing railways, in which many of the contingencies met with in the original construction and in the development of the properties during the past thirty years, have been made

known to me by officers of the respective companies associated with the construction and development of the properties.

"From the careful examination made of the lines and from a study of the original construction profiles, I was enabled to observe the truthfulness of the representations made to me of difficulties encountered and expenditures made in constructing and perfecting the lines, and it was possible to include under their proper headings many things which otherwise would have been unknown and consequently disregarded in the estimate of reproduction cost.

"Considering the detail with which the estimates have been prepared and the inclusion in them of many items of a contingent nature, it does not appear justifiable to consider an estimate of the cost of reproducing a railway, as synonymous with an estimate for constructing a projected line. The essential difference rests in the fact that in reproduction cost the estimate is prepared in the light of known conditions, whereas for a projected line the contingencies are wholly unknown. These facts have been instrumental in reaching a determination that 5 per cent. for contingencies is fair under the circumstances attaching to the work of this appraisal.

"Such data as appeared to reflect the normal condition of the money market, aided by the consensus of opinion as expressed in the reports of the railways seemed to justify 4 per cent. per annum as a fair rate of interest to apply to the estimated cost of reproduction.

"The rate of interest as established is applied to the total estimated cost of reproduction assuming that the necessary funds would be fully employed one-half of the estimated time required to build the respective lines, which, according to their mileage, carried from one to eight years."

#### "PRESENT VALUE."

The plan of appraisal, as indicated above, contemplated the ascertainment of the "present value" of the properties, as well as their cost of reproduction. With few exceptions the railways did not supply data "involving such modification of the figures of reproduction costs new, as might reasonably be attributed to the action of elements and to wear and tear by time and use." Mr. Morgan attributes this to divergence of views between railway officers, some thinking there is no depreciation in the physical properties of a railway—that an old line, through thorough maintenance and for other numerous and good reasons, is more serviceable and valuable than a new one. The Commission's engineers, however, made estimates of "present value" of the properties to correspond to estimates "A" and "B" or cost of reproduction; and these for the various roads are given to the table entitled "Mileage, Capitalization and Valuation of Minnesota Railways." Table III, entitled "Cost of Reproduction and Present Value of Physical Properties," gives in detail the Commission's estimate "A" of the cost of reproduction new and the present value after depreciation of the various elements entering into the physical properties.

In the report appears a similar table giving the Commission's estimate "B" of the probable cost and present value of the various elements, but this differs from estimate "A" only because of the difference of \$37,515,054 in the appraisal placed in the two estimates on the single item of land.

It will be noted that there are really four valuations: (1) Estimate "A," total cost of reproduction new, of all roads, \$411,735,194, or \$52,430 per mile for the carrying and \$770,933 per mile for the switching roads. (2) Estimate "A," total present value (1907), \$360,480,160, or \$45,799 per mile for the carrying roads and \$717,160 per mile for the switching roads. (3) Estimate "B," cost of reproduction, new, \$373,820,141, or \$46,203 per mile for the carrying roads and \$579,718 per mile for the switching roads. (4) Estimate "B," present value, \$322,565,106, or \$39,571 per mile for the carrying roads and \$525,945 for the switching roads. The average capitalization per mile of the carrying roads (\$44,206) is less than either of the first three valuations for them. In a way

the Commission really made six valuations. By omitting from estimates "B" \$12,858,593 which it had allowed for adaptation and solidification of roadbed, it reduced those estimates to, cost of reproduction new, \$360,961,548, and present value, \$309,706,514. It is evident that all these estimates were made so that, whatever the courts might ultimately hold to be a fair basis of valuation, the Commission would have available a valuation that would meet the courts' views.

#### ORIGINAL COST OF CONSTRUCTION.

The Commission also desired to ascertain the original cost of construction of the various properties, but Mr. Morgan

TABLE III.—Cost of Reproduction and Present Value of Physical Properties, All Lines.

Subject.	Cost of reproduction new.	Present value.
Land for right of way, yards and terms	\$73,201,757.70	\$73,201,757.70
Grading, clearing and grubbing	56,006,782.11	56,006,782.11
Protection work, rip-rap, retaining walls	2,419,292.42	2,419,292.42
Tunnels	253,250.00	215,262.50
Cross ties and switch ties	17,491,500.06	9,627,539.85
Ballast	9,413,351.34	9,413,351.34
Rails	33,010,087.72	25,199,668.20
Track fastenings	5,936,740.60	4,543,054.70
Switches, frogs and railroad crossings	1,389,363.52	962,741.45
Track laying and surfacing	5,340,689.05	5,340,689.05
Bridges, trestles and culverts	19,567,524.80	14,518,834.30
Track and bridge tools	201,918.21	151,438.71
Fences, cattle guards and signs	2,768,394.93	1,403,082.54
Stock yards and appurtenances	559,896.21	349,759.71
Water stations	1,606,164.62	1,144,535.43
Coal stations	717,519.88	507,703.49
Station buildings and fixtures	5,855,258.56	4,097,249.08
Miscellaneous buildings	4,344,684.37	3,403,171.52
Steam and electric plants, gas plants	797,484.52	656,069.99
General repair shops	4,123,119.91	2,959,019.07
Shop machinery and tools	1,831,671.22	1,484,756.11
Engine houses, turntables & cinder pits	2,837,988.58	1,874,436.40
Track scales	184,130.00	129,474.45
Docks and wharves (inc. coal & ore)	6,065,496.69	5,392,960.85
Interlocking plants	403,071.57	293,197.56
Signal apparatus	155,766.71	126,217.89
Telegraph lines and appurtenances	1,316,048.16	994,227.19
Telephone lines and appurtenances	94,526.17	70,926.17
Adaptation and solidification of roadbed	11,743,007.15	11,743,007.15
Total	\$269,636,486.78	\$238,230,206.93
Engineering, superintendence, legal expenses, 4½ per cent.	12,133,641.89	12,133,641.89
Total	\$281,770,128.67	\$250,363,848.82
Locomotives	17,090,953.40	12,608,422.67
Passenger equipment	6,616,170.78	4,554,442.63
Freight car equipment	46,911,106.58	34,068,095.26
Miscellaneous equipment	1,326,666.16	876,057.17
Marine equipment	43,500.00	32,625.00
Total	\$353,758,525.59	\$302,503,491.55
*Freight on construction material	3,635,535.03	2,635,535.03
Total	\$357,394,060.62	\$306,139,026.58
Contingencies, 5 per cent., on above	17,869,703.02	17,869,703.02
Stores and supplies in Minnesota	5,210,010.98	5,210,010.98
Interest during construction	31,261,419.93	31,261,419.93
Grand totals	\$411,735,194.55	\$360,480,160.51

\*For cross ties, rails, track fastenings, switches and frogs.

states investigation has shown that data on this point for most of the large roads is entirely unavailable.

In the preface by the Commission to Mr. Morgan's report, the Commission says:

"Another important work in connection with valuing the properties, to be undertaken by the Commission, is to establish the original cost of the lands to the railways. It must be apparent to all that if the constantly increasing value of railway properties is to be taken as the basis for computing proper returns without regard to the original cost of the same, it is only a matter of time when transportation companies will, by absorption, own a disproportionate share of the wealth of the country."

The shipments of fresh flowers to Berlin during the winter from Italy and the French Riviera have become so important as call the attention of the railway authorities, who questioned whether space could be afforded for them on the express trains, and asked the Berlin Chamber of Commerce whether the local green-houses could supply the demand at reasonable prices, in case they should not be accepted on such trains. The answer was that it could not be, and that even the florists had nothing to gain by such exclusion.



## General News Section.

The timber-treating plant of the Mexican Central at Aguascalientes is now treating with Ebano oil 3,500 ties a day. The amount of oil absorbed by each tie is about three gallons. The ties thus far received are mostly from the United States (yellow pine), but some have been received from Japan.

A. W. McLaren, of the New York Central Lines, Chicago, who has been promoted to the position of Chief Clerk to Vice-President Daly, with office at New York, was the recipient on January 30 of a handsome gold diamond studded watch fob, the gift of officers and employees of the New York Central Lines at Chicago.

J. Sullivan, Traveling Engineer of the Cincinnati, Hamilton & Dayton, has been nominated by Governor Judson Harmon, of Ohio, as a member of the State Railroad Commission, to succeed J. C. Morris. Mr. Morris was nominated for another term by Mr. Harmon's predecessor, Governor Harris, and was confirmed by the Senate, and it is said that he will resist the action of Gov. Harmon superseding him.

The government has brought suit in the United States District Court at Chicago against the Atchison, Topeka & Santa Fe for violation of the federal law regulating the time service of telegraphers. Seven violations are charged. It is charged that the road keeps operators on duty at Corwith, Ill., from 6.30 a.m. to 6.30 p.m., with three hours off at noon, and that this is an evasion of the law. This will be made a test case to determine the true meaning of the law.

The St. Louis & San Francisco now numbers its trains by divisions. Trains on the Eastern division will be numbered below 100, except branch trains, which will be numbered between 1,200 and 1,300. The Northern division trains will be numbered above 100 and below 200, the Ozark division trains above 200 and below 300, etc., the highest numbers to be on the Southeastern division, where trains will be numbered over 900 and under 1,000. Foreign line trains on any division will be numbered over 1,300 and under 1,400. Through trains out of St. Louis and Kansas City will carry their numbers through to ultimate destination regardless of the numbers of the divisions they run over. Through trains which do not run from St. Louis or Kansas City take the series of numbers which are assigned to the division over which they run.

Superintendent H. P. Lincoln, of the Eastern and Susquehanna divisions of the Pennsylvania Railroad, has written a letter of commendation to Brakeman George B. Donly, of Williamsport, for prompt and courageous action when an engine blew up near Pine Creek Junction January 7. The train, a freight, was moving at about 30 miles an hour. Suddenly the crown-sheet of the locomotive dropped, blowing open the firebox door and forcing out steam and burning coal. The engineman and fireman at once jumped off, but Donly, who had been shoveling down coal on the tender, jumped over to the side of the tender and, holding on with his hands, worked himself to the engine, jumped to the engineman's seat and applied the airbrakes. As the explosion had not interfered with the engine's running, and as the train was running down grade toward Newberry, there might have been a collision or other smashup if the train had not been promptly brought under control. Donly was commended for his physical courage as well as for his quick wit. The act was all done in a few seconds, while live steam was still escaping.

### Private Car Owners' Wishes.

The changes which are desired in the Master Car Builders' rules for the interchange of cars, which have been drawn up by the Individual Car Owners' Association, have been considered and approved by a committee of private car owners and have been sent to the officers of the M. C. B. association. The committee transmitting the proposed rules consists of J. M. Belleville, J. B. Frost, F. H. Stark, V. B. Ward and Robert J. Bailey. Mr. Bailey, who is Secretary of the Indi-

vidual Car Owners' Association, represents the Monongahela River Consolidated Coal & Coke Co. Among the changes proposed are a number of reductions in prices of couplers and coupler parts and journal bearings. The private owners desire to have representation on the Arbitration Committee of the Master Car Builders' Association; and they also desire that anyone owning 100 or more cars shall be made eligible to membership in the association.

### Proposed Workmen's Compensation Act in New York.

On January 13 there was introduced in the assembly of the state of New York by Mr. McGregor a bill entitled "An Act respecting compensation to workmen for accidental injuries suffered in the course of their employment." While the text of the bill is considerably abbreviated from that of the law in force in England since July 1, 1907, it is based wholly upon the English law and is to all intents and purposes the same in scope and principle. As its provisions may be taken as representative of the views of organized labor the bill is of more than passing interest even at its present stage. The substance of the bill is as follows:

"Workman" is defined to mean every person who is engaged in an employment, whether by way of manual labor or otherwise, and whether his agreement is one of service, apprenticeship or otherwise, and is expressed or implied, is oral or in writing. The liability of an employer for personal injury to an employee by accident arising out of and in the course of his employment is set forth as follows:

The employer shall not be liable in respect of any injury which does not disable the workman for a period of at least two weeks from earning full wages at the work at which he was employed.

When the injury was caused by the personal negligence or wilful act of the employer, or of some person for whose act or default the employer is responsible, nothing in this act shall affect the civil liability of the employer, but in that case the workman may, at his option, either claim compensation under this act, or take the same proceedings as were open to him before the passage of this act.

If it is proved that the injury to a workman is attributable solely to the serious and wilful misconduct or serious neglect of that workman, any compensation claimed in respect of that injury shall be disallowed.

If any question arises in any proceedings under this act, or as to the amount or duration of compensation under this act, the question, if not settled by agreement, shall be settled by arbitration.

If, within six months from date of injury or death, an action is brought to recover independently of this act for injury caused by any accident, and it is determined in such action that the injury is one for which the employer is not liable in such action, but that he would have been liable to pay compensation under the provisions of this act, the action shall be dismissed, but the court in which the action is tried shall, if the plaintiff shall so choose, assess such compensation and shall be at liberty to deduct from such compensation all the costs which, in its judgment, have been caused by the plaintiff bringing this action instead of proceeding under this act.

When death results from injury it is provided that the workman's dependants shall be entitled to a sum equal to the amount of his earnings in the employment of the same employer during the three years next preceding the injury but not exceeding \$1,500. Any weekly payments that may have been made are to be deducted from this sum. Where total or partial incapacity results from the injury the employee shall be entitled to a weekly payment during incapacity not exceeding 50 per cent. of his average weekly earnings during the previous 12 months, not exceeding \$10 per week, and in the aggregate not exceeding \$1,500. He shall at the request of the employer be required to submit himself to medical

examination or payment may be withheld, and this examination may be required from time to time. Any matter in dispute may be settled by submission to a committee representing employer and workman or an arbitrator appointed by a judge of the Supreme Court. Attorney's fees shall be determined by the arbitrator and he may submit any question of law to the decision of a judge of the Supreme Court.

The provisions of the bill apply only to accidents occurring after January 1, 1910.

#### Report of the Interborough Rapid Transit.

The report of the Interborough Rapid Transit Co. to the New York Public Service Commission for the year ended June 30, 1908, gives the following figures:

##### PASSENGERS CARRIED.

###### (a) By Months.

Month.	Total No.	Daily Av.	Month.	Total No.	Daily Av.
July, 1907..	34,247,071	1,104,757	Feb., 1908..	40,758,224	1,405,456
Aug., 1907..	34,007,461	1,097,015	Mar., 1908..	43,994,740	1,419,185
Sept., 1907..	35,424,663	1,180,822	Apr., 1908..	43,760,832	1,458,694
Oct., 1907..	42,925,194	1,384,684	May, 1908..	42,946,254	1,385,363
Nov., 1907..	41,131,899	1,371,063	Jun., 1908..	38,735,576	1,291,186
Dec., 1907..	42,548,192	1,372,522			
Jan., 1908..	42,805,534	1,380,824	Total..	483,285,640	1,320,453

###### (b) By Lines.

Elevated.	Passengers.	Car-miles.	Lines.	Passengers.	Car-miles.
2d Ave. . .	45,189,264	9,900,261	Sub. Div..	200,439,776	44,005,213
3d Ave. . .	122,624,928	26,074,326			
6th Ave. . .	84,054,338	16,343,768	Total..	483,285,640	108,589,822
9th Ave. . .	30,977,334	12,266,254			

##### General Statistics.

Owned and leased:	1907.	1908.	Change.
Miles of first track .....	59.80	62.31 Inc.	2.51
Total track mileage .....	190.53	197.30 "	6.77
Thereof elevated (3d rail) ..	134.02	134.02 "	—
Thereof subway (3d rail) ..	56.51	63.28 "	6.77
Trackage rights, single mlge..	2,270	2,510 Inc.	240
Cars—total No., all kinds .....	2,152	2,392 "	240
Passenger, exclusive open cars	—	120,824	—
Total seating capacity .....	—	1,783,452	—
Average No. operated .....	—	1,783,452	—
Total No. trips made .....	98,792,770	108,589,822 Inc.	9,797,052
Total No. (passgr.) car-mile run.	6,281,871	6,752,924 "	471,053
Total No. (passgr.) car-hours ..	449,287,884	483,285,640 "	33,997,756
Passengers, No. of 5-cent. fares.	—	14,962,300	—
No. of transfers collected .....	No record.	No record.	—
Number carried free .....	—	3,132	—
Accidents—total number .....	—	3,211	—
No. causing personal injury..	39	53 Inc.	14
No. of persons killed .....	85	3,868 "	3,783
No. of persons injured .....	9,015	9,521 "	506
Officers and employees, June 30	557	595 "	38
No. of motormen, June 30 .....	531	530 Dec.	1
No. of conductors, June 30 .....	\$6,148,917	\$6,610,722 Inc.	\$461,805
Total pay officers and employees			

\*16,415,372 of these paid 4-cent fares.

##### Income Account.

Pasgr. rev., inc. chartered cars.	\$22,303,633	\$24,000,128 Inc.	\$1,696,495
Freight and other car earnings.	60,169	59,171 Dec.	998
Advertising, news privileges, etc	404,333	451,000 Inc.	46,667
Rents .....	11,669	19,986 "	8,317
Sale of electric current .....	107,775	145,629 "	37,854
Telegraph privileges .....	15,000	15,000 "	—
Miscellaneous .....	—	8,591 "	8,591
Total earnings st. ry. oprtns.	\$22,902,580	\$24,699,505 Inc.	\$1,796,925
Maint. of way and structures ..	\$1,169,165	\$1,334,509 Inc.	\$165,344
Maintenance of equipment .....	1,515,431	1,798,336 "	282,905
Operation of power plant .....	1,983,329	2,167,510 "	184,181
Operation of cars .....	3,907,878	4,244,492 "	336,614
Damages, incldg legal expenses.	202,353*	363,065 "	160,530
General expenses .....	814,993	814,782 Dec.	211
Total st. ry. op. expenses .....	\$9,593,331	\$10,722,695 Inc.	\$1,129,364
Taxes accrued .....	\$1,377,965	\$1,586,466 Inc.	\$208,501
Operating income.† .....	\$11,931,283	\$12,390,344 Inc.	\$459,061
Non-operating income .....	\$277,055	\$579,965 Inc.	\$302,910
Gross income.‡ .....	\$12,208,339	\$12,970,309 Inc.	\$761,970
Interest on funded debt .....	\$766,667	\$1,250,000 Inc.	\$483,333
Rentals: Interest .....	1,809,680	1,809,680	—
Dividends .....	4,116,000	4,200,000 Inc.	84,000
City of New York .....	1,789,548	1,991,985a	202,437
Cash .....	10,000	10,000	—
Amortization of debt discount and expense .....	—	7,985 Inc.	7,985
Total charges to income .....	\$8,491,895	\$9,269,650 Inc.	\$777,755
Surplus for year .....	\$3,716,444	\$3,700,659 Dec.	\$15,784
Previous surplus .....	2,295,690	1,224,241 "	1,071,458
Total surplus .....	\$6,012,133	\$4,924,900 Dec.	\$1,087,243
Dividends on stock .....	3,150,000	3,150,000	—
Credits to corporate surplus .....	1,062,902b	56,843 Dec.	1,119,745
Surplus June 30 .....	1,799,241	1,831,743 Inc.	32,502

\*In 1907 the item "Legal expenses in connection with damages" was included in "Miscellaneous Legal Expenses" (under General Expenses).

†Gross earnings less operating expenses and taxes.

‡Applicable to corporate and leased properties.

a Measured by the Interest and Sinking Fund on bonds issued by the City of New York for the construction of the rapid transit railway.

b Charges.

##### Income Statement for the Quarter Ended September 30th, 1908.

	Elevated.	Subway.	Total.
Earnings from operation .....	\$3,093,838	\$2,235,049	\$5,328,888
Operating expenses .....	1,587,198	1,088,511	2,675,710
Net earnings .....	\$1,506,639	\$1,146,538	\$2,653,178
Other income .....	129,330	207,845	337,175
Gross income .....	\$1,635,969	\$1,354,383	\$2,990,353
Deductions from Income:			
Interest on funded debt .....	—	\$500,000	\$500,000
Taxes:			
On property used in operation	\$30,000	15,000	45,000
On earnings and capital stock	42,626	—	42,627
On other than above .....	310,000	—	310,000
Rentals .....	1,462,655	*535,773	1,998,429
Amortization, debt discount & exp..	—	3,108	3,108
Total .....	\$1,845,282	\$1,053,881	\$2,899,164
Net income .....	209,312†	300,502	509,814

\*Rental due City of New York measured by interest and sinking fund on city bonds issued for construction of rapid transit railway.

† Loss.

#### New Freight Terminals for the Alton.

The Chicago & Alton is planning to build new freight terminals at three important points—Chicago, Kansas City and Joliet. The new Chicago yards will be at Summit, just outside the city limits and about 12 miles from the Union Station. The company bought 295 acres of land adjoining its right-of-way about four years ago for this purpose, as it was then evident that track elevation and the growing need for larger terminal facilities would compel the construction of yards outside the city. The new yards will relieve the Brighton Park yards of freight business, but the latter will continue to be used for passenger business as at present. As a result of the removal of the freight business from Brighton Park to Summit about 20 acres of the former yards will be abandoned and will be sold or used for manufacturing sites. The Summit yards will have capacity for 1,000 freight cars or more.

Track elevation at Joliet will compel the abandonment of the present yards, having a capacity of 800 cars. New yards are to be built at South Joliet with a capacity of 1,000 cars, 100 acres of land having been bought many years ago for this purpose.

At Kansas City such yards as the road has are at Twelfth street and Lydia avenue, near the Union Station. They are small and badly crowded, as well as inconvenient, it being necessary to turn passenger equipment on the locomotive turntable. A tract of 42 acres has been bought in East Bottoms, where yards having an ultimate capacity of 1,500 cars are to be built. The Twelfth street yards will be used only for local freight purposes. The present freight house at that point will be torn down and rebuilt to double the present capacity. The capacity of the Grand avenue freight house has recently been doubled. The cost of these three yards, exclusive of real estate, will be \$300,000, \$85,000 and \$200,000, respectively, for Chicago, Joliet and Kansas City.

#### Queensboro Bridge to be Opened.

The Queensboro Bridge Celebration Committee has announced June 12 as the date for the official opening of the cantilever bridge across the East river at Blackwell's Island, New York City.

#### The New York State Barge Canal.

The annual report of the State Engineer and Surveyor of New York gives the present status of the barge canal. During the calendar year 1908 awards to the amount of \$13,421,752 were made, so that there are now in force contracts for building 194 miles of canal, the contract price for these being \$35,739,213, including all alterations to date. This means that nearly one-half of the whole project, both in length and in cost of construction, is at present under contract. Most of the important plans for the remainder of the barge canal are completed. During 1908 nearly \$5,500,000 worth of construction work has been done, two and one-half times that of 1907.

The report speaks in favor of securing Federal aid for the



canalization of the Hudson between Congress street bridge, Troy, and Waterford, and points out the need of improved terminal facilities for canal traffic at the ports of Buffalo and New York, so that the capacity of the barge canal shall not be limited by the present inadequate provisions.

#### The Railway Business Association—An Inside View.

BY G. M. BASFORD,  
Acting Secretary of the Association.

For 60 days out of the 120 days of the life of the Railway Business Association it has been the good fortune of the writer to be associated with this unique movement, and it is with regret that pressure of his own work makes it necessary for him to turn over to other hands the official duties of the position of Secretary. A pleasant obligation will be fulfilled if some additional light may be thrown upon the accomplishments and possibilities of the work of the association from the inside.

It is doubtful if any association has ever before in such a brief period received such co-operation and recognition. Never before have the commercial interests dealing directly with the railways been organized in such a way as this.

For very well understood reasons the railways have not yet begun to share in the return of prosperity and while many commercial interests are busier than they were, those concerned in supplying railways with material and equipment have been unable to secure orders sufficient to put their men back on full time. This serious situation brought together our members in an effort to effect a change in public opinion which would lead to an improvement of the general railway situation and aid in restoring normal conditions.

This movement was not only necessary but timely. The pendulum of popular sentiment had swung adversely to the railways and swung too far, as indicated by a large amount of legislation, which affected the transportation interests by increasing the cost of railway operation, while curtailing revenues.

At a recent dinner in New York the statement was made that during the years 1906 and 1907 the British Parliament enacted 114 laws for the government of Great Britain and Colonies, whereas during the same time Congress and the state legislatures of the United States enacted 25,000 laws. It is reasonable to doubt that 12,000 wise laws, per year, can be enacted in any country. The thinking people who constitute the safeguard of the nation had begun to recognize that the railway interests could not be adversely affected by restrictive legislation without affecting all other human interests. There has been no general sentiment in favor of weakening restriction of railways, but there is a growing conviction that restriction must be intelligent.

The way in which the members of the Association rallied to the call is scarcely more impressive than the ready support of the commercial public. By a combination of very important manufacturing concerns into a good-natured association, public opinion has crystallized to a gratifying extent and legislators, both state and national, have heard from the people in a voice devoid of quavering.

Some of the largest commercial associations have been ready and willing at the suggestion of the Association to make pacific utterances. Responses from the largest cities and from national associations covering the entire country have been surprising. The voice asking for legislative quiet and for true statesmanship with respect to railway enactments has come from many directions and from many interests, some of them being entirely separated from railway affairs. Those, for instance, who make and sell shoes have co-operated through their national organizations to indicate appreciation of the fact that the welfare of those concerned in transportation is involved with their own welfare to such an extent as to justify a long step from their beaten paths to correct the unfortunate situation in which our members find themselves.

One reason for this co-operation lies in the recognition of the fact that the personnel of the Association is remarkable in including men known for the most successful engineering, manufacturing and commercial achievements. Some of our constituent concerns are as large commercially as a fairly

large railway. The number of men employed by such concerns as are represented in our membership is as great as the number employed by the railways. Our Association has conflicting competitive interests, all united in the bond of good fellowship to carry out the plan which makes for the common good. This plan is conducted absolutely independently of the railways. It has been shown for the first time to be possible for influence outside of the railways to band together to promote by organized action a realization of the inter-dependence between the public and the transportation interests.

Our activities are by this time very well known. In four months the fact has been demonstrated that the people are ready not only to acknowledge what the railways have done for the country, but to give transportation questions the consideration which they deserve. To turn the light on obscure questions affecting the relation between the people and the railways, tending to prevent extremes in legislation, constitutes a permanent work for this organization.

Not all the work already accomplished has been easy. The railways as well as the public have their part to do and the work of the Association will include efforts to bring about a permanent friendly relationship. This cannot be done in a short time.

One of the most effective elements of the success of this Association is the generous good fellowship of its members. The organization already extends into 16 states and often competitive interests in the same city are united in local achievement. No discordant notes are heard in the conduct of its affairs and it is inconceivable that any will be heard under the leadership of such a personality as that of the president of the Association, sustained by, and enjoying, the constant counsel of the able, energetic and potential men who compose its general executive committee. These two months in the executive office have been so crowded with important development that they have seemed exceedingly short.

At the outset, reasonable doubt of the possibilities of the movement may have been justified. Some may have felt that it was too intangible and experimental to win their instant support. Now there is no room for doubt. It is no longer experimental. The writer regrets that because of compelling business obligations, he cannot continue in direct co-operation with a work so inspiring. This brief time has convinced him that the need for the organization was great, the field for its efforts wide, the plan of its work effective.

It is equally clear that so much remains to be done as to justify the question: How can any concern engaged in supplying the railways with their requirements delay enrollment in the Railway Business Association?

#### Cost of the Cattle Quarantines.

Officers of the Pennsylvania Railroad are congratulating themselves on the extinction of one of the most remarkable epidemics among cattle in the history of the country, the hoof and mouth disease. The Secretary of Agriculture has lifted the general embargo on the interstate movement of cattle from the states of Pennsylvania, New York and Maryland, but to guard against the possibility of another outbreak, quarantine still applies to cattle moving from certain counties in those states, though even this embargo is likely to be lifted within a short time. On November 12 the Secretary of Agriculture placed the interstate embargoes and the Pennsylvania Railroad acted promptly to prevent any cattle moving out of or into the affected area. Shipments were also stopped outside the area, and cared for, facilities being hired when necessary. The quarantine was subsequently extended to the entire state of Pennsylvania, New York, Maryland and Michigan. Interstate traffic in cattle, hides, hay, straw and fodder was forbidden. Shortly afterward, Canada placed an embargo on New Jersey and Delaware in addition to the above states, and also imposed a quarantine to cover even goods packed in hay or straw.

As soon as the epidemic became apparent, the Pennsylvania set about an exhaustive inquiry to ascertain the source of infection. It was found that the disease had emanated from Buffalo. It was then comparatively easy to trace what had become of the shipments from Buffalo, and to locate the area

of possible infection. The state authorities actively co-operated in imposing legal obstacles to the movement of cattle between different parts of the states. The Pennsylvania not only issued the usual orders, but sent instructions to its agents by telegraph, and the amount of telegraphing exceeded that occasioned by any other similar event on record. To avoid delay in delivering Christmas packages, the company unloaded and repacked in sawdust and excelsior many packages destined to Canada. All animals which had been shipped from the infected areas to Pittsburgh, Lancaster, Baltimore and Philadelphia, as well as many other important points on the road, were segregated in separated pens.

About 2,100 stock cars have been cleaned each week since November 12, a total of 16,800 cars on the Pennsylvania Lines East of Pittsburgh, at a cost of about \$3 for each cleaning. Railway companies have been required at their own expense after each trip to scrape all dirt out of each car, disinfect with a solution of carbolic acid, and when refuse on the floors of the cars was frozen, to steam them. All of this has been done under the direction of government inspectors, and every car has been marked and sealed by an inspector after each cleansing. To do all this the railway company had to increase largely its force of cleaners at Baltimore, Philadelphia, Lancaster, Harrisburg, Pittsburgh and Jersey City, and all cattle cars have been made practically aseptic at the beginning and end of each trip.

The Bureau of Animal Industry at Washington has had a force of 150 veterinarians, and as many more non-professional men, engaged in eradicating the disease, the cost of which, it is estimated, will be fully \$500,000 in Pennsylvania, Maryland and Michigan. Many animals have been slaughtered.

#### Changes in Express Business.

The Chicago, Milwaukee & St. Paul has given up its plan for an express service of its own, and after May 1 next the express service on the new line to the Pacific coast, as well as on the company's existing lines, will be furnished by Wells, Fargo & Co. The United States Express Co. will continue to operate on the lines of the St. Paul proper until May 1. The Continental Express Co., organized by the railway company and which now is operating the new Pacific coast extension as far as Butte, will be dissolved.

The Wells, Fargo Co., whose concessions to operate over the Mexican Central expired on January 1, is now operating under a temporary agreement made in October with the understanding that at some time in the near future it will take over the express business on all government controlled railways in Mexico. The arrangement will probably become operative immediately after the merger of the National lines and the Mexican Central goes into effect.

The railways embraced in the new contracts lately made by the United States Express Co., to take effect July 1, or soon after, are the following:

Benumont, Sour Lake & Western.	Fort Worth & Rio Grande.
Chicago & Eastern Illinois.	Orange & Northwestern.
Chicago, Rock Island & Pacific.	Paris & Great Northern.
Chicago, Rock Island & Gulf.	St. Louis & San Francisco.
Chicago, Rock Island & El Paso.	St. Louis, San Francisco & Tex.
Colorado South., New Orleans & Pac.	Trinity & Brazos Valley.
Evansville & Terre Haute.	

#### Washington Letter.

WASHINGTON, Feb. 3.—The action of the House Committee on Interstate and Foreign Commerce in deciding not to bring out any amendments of the Hepburn law at this session was only in part due to the attitude of the Senate. It is true that Senators discouraged any attempts to amend the law at this short session of Congress, and this was given due weight in arriving at the conclusion not to report any of the bills now before the committee, but it was also felt that public sentiment at this time does not justify any legislation which might be construed as hostile to the railways.

This latter consideration, in fact, had perhaps more than anything else to do with the decision. Leading members of the committee held to the view that if any legislation were to be attempted it might readily be construed by the public

as nothing more than a demagogic effort to bolster up the political fortunes of those behind the bill. Therefore it was thought wiser to wait until the people themselves cried for relief with a cry which could not be misunderstood, and if they did not so cry it might safely be assumed that the law was all right as it was.

In the meantime, however, it is the intention of the committee to collect a mass of material to show how well or how badly the law is operating. Also whether it is more useful to the carriers than to the public, as has been alleged. This will be done in the hope that public sentiment on the subject may be crystallized to show more certainly what, if anything, is the matter with the law, and how to remedy it.

At the same time the action of the committee makes it nearly certain that there can be no legislation affecting the railways until the long session of the new Congress, beginning next December, as there will be no committees named at the special session save those on Ways and Means, Mileage, Rules, Accounts, etc. That is, there will be only those necessary to pass the tariff bill. At least that is the present intention, and it is likely that nothing will change this unless some great emergency arises demanding the instant attention of Congress, and this is, of course, most improbable. So ends the Fulton bill with Senator Fulton, who goes out of the Senate March 3.

G. G.

#### MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; May 11-14, 1909; Richmond, Va.  
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; May 11; St. Louis, Mo.  
 AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.  
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Pl., New York; May 19, 1909; New York.  
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.  
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago; March 16-18, 1909; Chicago.  
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 16-18, 1909; Atlantic City.  
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and Aug.; New York.  
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.  
 AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York.  
 ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 28, 1909; Cincinnati.  
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A. T. & S. F., Topeka, Kan.; last week in May, 1909; Detroit, Mich.  
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago; June 23-25, 1909; Detroit.  
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., New York; June 22-23; Montreal.  
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.  
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.  
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.  
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich. Fred. & Pot. R.R., Richmond, Va.; June 16, 1909; Old Point Comfort, Va.  
 INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 62 Liberty St., New York; May, 1909; Louisville, Ky.  
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; June, 1909.  
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—E. C. Cook, Royal Insurance Bldg., Chicago; June 1-5; Chicago.  
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.  
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 21-23, 1909; Atlantic City.  
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.  
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.  
 NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, Aug.; St. Paul and Minn.  
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburg, Pa.; 4th Friday in month, except June, July and August; Pittsburg.  
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; March 15, 1909; Chicago.  
 RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio; May 17-19; Chicago.  
 ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Nov., 1909; Washington.  
 ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.  
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.; April 15; Atlanta, Ga.  
 SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.  
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R.R., East Buffalo, N. Y.; September, 1909; Denver.  
 WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.  
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.



**International Railway Fuel Association.**

At the first annual meeting of the International Railway Fuel Association in Chicago in June next, reports will be made on the following subjects:

"Proper method of purchasing fuel." Thomas Britt (C. P.), Montreal, Chairman of Committee.

"Standard type or types of coaling stations." J. H. Hibben (M., K. & T.), Parsons, Kan., Chairman.

"Best method of accounting for fuel, including movement from mine through coaling station to engines up to monthly balance sheet." J. P. Murphy (L. S. & M. S.), Colliewood, Ohio, Chairman.

"Difference in mine and destination weights. Legitimate shrinkage allowable on car-lots." F. C. Meagley (A., T. & S. F.), Chicago, Chairman.

"Difficulties encountered in producing clean coal for locomotive use." Carl Scholz (Rock Island-Frisco Lines), Chicago, Chairman.

**American Society of Civil Engineers.**

At the meeting held on Wednesday, February 3, a paper by Robert Spurr Weston, Assoc. M. Am. Soc. C. E., entitled "The Purification of Ground-Waters Containing Iron and Manganese," was presented for discussion. This paper was printed in "Proceedings" for December, 1908.

**Traffic News.**

The Fort Worth Freight Bureau has adopted a resolution opposing two-cent fare legislation in Texas.

By the action of the Trunk Line Association, approved by all roads in interest, through first-class passengers henceforth may stop over three days in Pittsburgh.

A meeting of the Transcontinental Freight Bureau was held in Chicago last week to receive protests from shippers against changes that have been made in freight rates to Pacific coast points. A large number of shippers appeared before the committee.

The Merchants & Miners' Transportation Company is to soon start a line of steamers between Jacksonville and Savannah, which ports for several years have been without regular water communication, although a decided demand has existed for such passenger and freight service. There are to be three ships a week.

The Buffalo, Rochester & Pittsburgh, having won its suits in the courts against the several counties along its line, has advanced its passenger rates to 2½ cents a mile. This restores the fares to the basis on which they were made previous to October, 1907, when the Pennsylvania 2-cent law went into effect.

Tariffs are being filed by various railways withdrawing special commutation rates for school children that they have had in effect. The Baltimore & Ohio has withdrawn the interstate rates for school children from Hammond, Gary and Whiting, Ind., to Chicago, but leaves the similar intrastate rates still in effect.

It is given out in Washington that the refunds which are to be made by the principal railways in the South on account of the decision of the Interstate Commerce Commission, disapproving the advance of two cents per 100 lbs. in the rates on lumber, which the railways put in effect in 1903, will amount to \$155,000, this sum representing the overcharges claimed in 125 cases.

The Interstate Commerce Commission, which has been making a general investigation of the subject of free travel, has held a hearing at Boston, in what is called a "friendly inquiry" concerning the issuance of passes on the Boston & Maine. All persons receiving passes are being classified in great detail, and both the ethics and economy of these passes, as affecting the road, are being fully explored.

Steps are being taken to organize a Transportation and Traffic Club at Louisville, Ky. W. H. Newman, Division

Freight Agent of the Chicago, Indianapolis & Louisville, is chairman of the committee on organization, and a committee has been appointed to draw up a constitution and by-laws. The proposed club will be composed of transportation and traffic representatives of railways and traffic managers of industrial concerns.

The readjustment of rates on grain moving from points in the Northwest via Chicago to points in the Southeast, which was announced a short time ago, has been balked by the dissent of some of the southern lines that were not represented at the meeting when the proposed change was decided on. Grain moving through Chicago has heretofore been charged a higher rate than grain moving through other gateways to the Southeast. It was proposed to put Chicago on the same basis as other gateways, but the Mobile & Ohio objected. It was found, for instance, that the differential in favor of St. Louis as against Memphis would be increased from 6 to 7 cents per 100 lbs., and the Mobile & Ohio heeded the protest of Memphis shippers.

The Boston & Maine has announced reductions in freight rates to western points (through Canada) to go into effect on March 4. The new rates are on the basis of 67 cents per 100 lbs., first-class, to Chicago. All lines taking freight west from New England have been agitated for many weeks past because the New York, New Haven & Hartford is said to be taking an unduly large share of freight for the west (sending it over the Canadian Pacific), some of it coming even from New York City; and it is said that the Boston & Albany will make reductions from Boston and other Massachusetts points to meet the reductions announced by the Boston & Maine. For many years the Boston & Maine rate was 10 cents (first-class) less than the standard rate of 75 cents. In 1901 the differentials were reduced to the basis of 5 cents, except on import traffic; later the rates on import shipments were also raised to the 70-cent basis. Complaint being made that Boston had advantage over Baltimore, the Boston & Maine adopted a new tariff on the basis of 67 cents. The other differential roads will, no doubt, make reductions to match those of the B. & M.

N. A. Stedman, attorney for all the principal railways in Texas, has issued a statement opposing 2-cent fare legislation in that state. He says that the gross earnings of Texas roads were 13 per cent. less, and their net earnings 40 per cent. less, in the year ended June 30, 1908, than in the previous fiscal year. Replying to a charge by F. O. Fuller, author of the pending 2-cent fare bill, that the railways have not made improvements which they promised when the 2-cent fare bill was dropped two years ago, Mr. Stedman denies that the railways made any promises; but he asserts that, since then, without any promise, they have spent for improvements and new equipment, in spite of the panic, about \$7,000,000. He says the Texas lines in the fiscal year ended June 30, 1908, earned less than 3 per cent. on the commercial value of their property, whereas other lines of business in the state earn an average of 8 per cent. net; and that "if assurance can be given that investors in railways will be permitted to earn 8 per cent. on their properties, millions of Texas capital will go into railways." He says a 2-cent fare would reduce the earnings of Texas lines \$4,000,000 a year and "so seriously cripple them, as a whole, as to bring them to the verge of bankruptcy."

**INTERSTATE COMMERCE COMMISSION.**

Evidence showing that a rate between two points is higher than other existing rates by other lines between these points is not sufficient proof that the given higher rate is unreasonable.

The act to regulate commerce provides that "all complaints for the recovery of damages shall be filed with the commission within two years from the time the cause of action accrues and not after \* \* \* provided that claims accrued prior to the passage of this act may be presented within one year." The presentation in writing of a claim to the commission within a year after the passage of the act, when the formal petition in the case was not filed until after the expiration of a year, was held to conform to the law. The law does not prescribe the form in which the complaint shall be made.

### Elevator Allowance.

*Nebraska-Iowa Grain Co. et al. v. Union Pacific.—Opinion by Commissioner Prouty.*

The various complainants herein seek reparation caused by alleged undue discrimination against them in favor of competitors in elevator allowances made by defendant at Omaha and Council Bluffs; defendant declined to pay these allowances, alleging that they were unlawful and that the terms of the tariffs were not complied with. This Commission cannot, without stultifying itself, make any ruling which will condemn as unlawful the payment of these allowances during the time they have been expressly sanctioned by its decisions.

The Commission finds with respect to all the shipments involved in these cases that the provision in the tariffs requiring a return to defendant of the car within 48 hours as a condition precedent to the payment of the allowance is unjust, unreasonable, unduly discriminatory, and unlawful; and that complainants are entitled to damages by reason of the maintenance of such unlawful provision which equal the amount which would have accrued to them by way of this elevation allowance, provided the tariff had contained no such provision. Defendant has paid to competitors of complainants this elevation allowance; it has at the same time declined to pay it to complainants. The Commission finds that defendant's reason for so declining is not a valid one, and that it has been guilty of undue discrimination against complainants, for which they are entitled to recover as damages the difference between what has been paid to their competitors and to them.

### Centralizer Creamery Methods and Rates.

*Beatrice Creamery Co. et al. v. Illinois Central et al. Blue Valley Creamery Co. et al. v. Michigan Central et al. Opinion by Commissioner Prouty.*

Complainants, engaged in the operation of creameries and using the centralized method, whereby supplies of cream are obtained by railways as distinguished from the local creamery method which obtains cream by wagon, insist that defendants' schedule of rates for the transportation of cream to Chicago between Detroit, Mich., and Port Huron on the east and Colorado common points on the west is too high, and asks the Commission to reduce it. On the facts disclosed in the record, the present rates are found excessive and defendants are ordered to establish a scale of rates prescribed as a maximum.

Several intervening associations, and representatives from the Department of Agriculture, claimed that the local creamery method of manufacturing butter should, in the interest of the public, be fostered and the centralizer method be discouraged; but such is not the impression left by the record. The centralizer is engaged in a perfectly legitimate business enterprise and affords to hundreds of thousands of farmers the only satisfactory means of disposing of their milk. It seems plain that the duty of this Commission is to establish just and fair transportation charges in so far as that can be done and allow these rival methods to operate under those charges. The Commission should not establish a scale of rates with a view and for the purpose of fostering or discouraging either form of this industry.

This Commission has several times held that where a particular industry has grown up under rates voluntarily established and maintained by carriers, these rates cannot be advanced without considering the effect upon that industry. There is no such thing as a contract between the railway and the shipper that a certain rate shall be charged, for the railway rate is a matter of public concern, which cannot ordinarily be made the subject of private contract, but in determining what is the just and reasonable thing to be done this Commission must consider the effect upon all parties.

### STATE COMMISSIONS.

The Pennsylvania State Railroad Commission has dismissed the complaint of citizens along the line of the Pennsylvania's freight railway, from Atglen to Schoch's Mills, holding that,

as the complainants are within three miles of railways doing a regular passenger and freight business, the public interest does not require that the new road, which was designed exclusively for heavy freight trains, should be provided with stations and other facilities to do a local business.

The Railroad Commission of Louisiana after a hearing on January 27 issued an order making a distance tariff on cotton seed, L.C.L. and C.L., to be used for planting, whether shipped in sacks, boxes, barrels or packages.

### COURT NEWS.

The Legislature of Arkansas has appropriated \$50,000 to defend the injunction suits instituted by the railways against the state to nullify the 2-cent passenger rate authorized by the last legislature and the freight schedules promulgated by the Arkansas Railroad Commission.

Hearings in the suit of the government to annul the practical consolidation of the Union and Southern Pacific Railways, which were begun in New York last month (see *Railroad Age Gazette*, Jan. 22, page 178), were resumed at Pittsburgh, January 27. Numerous representatives of shippers testified that previous to 1901, there was actual competition between the Union and the Southern Pacific, but that since then, joint agencies having been established, the competition was no longer apparent.

### Hearing in Missouri River Rate Case.

Testimony was taken at Chicago last week by J. L. Bennett, Special Examiner for the federal court, in the Missouri river rate case. Freight Traffic Manager Crosby, of the Burlington, was asked if some of the large jobbing centers in the middle west had not been built up on rebates. He had admitted that rebates had at times been given. Mr. Walter, for the government, stated that his aim was to show that these trade centers had been built up by rebates and not by the adjustment of rates that the roads are now defending. F. P. Eyman (C. & N. W.), W. S. Kallman (N. Y. C.), and H. C. Martin (Grand Trunk) defended the present adjustment of rates, and said that if the Commission's order were enforced it would pull down not only the rates directly affected, but many other rates. John L. Williams, Traffic Manager of the Sherwin-Williams Company, Cleveland, Ohio, said that the reduction ordered by the Commission would compel the closing of mills of this company east of Buffalo unless reductions were made from the points where those mills are situated corresponding to the reductions ordered by the Commission in rates from seaboard points.

### Railroad Regulation in Oklahoma.

The Missouri, Kansas & Texas has filed a petition in the Supreme court of Oklahoma, setting forth that the order of the State Corporation Commission requiring all railways to notify the Commission immediately by telegraph of any accident, is unjust and unreasonable, and asking the court to set aside the order. The Kansas City Southern has appealed from the order of the Commission requiring it to establish a depot at Ballard. It is expected that there will soon be a large number of appeals to the Supreme court from rulings of the Commission. The court recently held that any company or person affected by rulings of the Commission has one year in which to appeal to the court and that it is not necessary to precede such action with a motion before the Commission for a new trial. The provisions of the Oklahoma constitution creating the State Corporation Commission are substantially similar to the similar provisions in Virginia, so that the recent decision of the Supreme Court of the United States in the Virginia 2-cent fare case has a direct bearing upon railway litigation in Oklahoma, and establishes the principle that any appeals from the Commission must be made to the state supreme court before they can be taken to a federal court.



## REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF DECEMBER, 1908.

Name of road.	Mileage operated at end of period.	Operating revenues				Operating expenses		Not operating revenues (or loss).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decrease) last year.
		Freight.	Passenger.	Inc. misc.	Total.	Way and structures.	Maintenance of equipment.					
Atchafalaya, Topeka & Santa Fe.....	7,458	\$4,406,068	\$1,391,869	\$6,551,190	\$11,797,927	\$822,450	\$683,956	\$1,506,406	\$1,704,508	\$1,704,508	\$2,990,914	\$860,900
Atlantic Coast Line.....	4,408	1,785,615	580,577	2,366,192	4,146,207	293,210	336,288	629,498	1,030,198	1,030,198	1,030,198	113,034
Buffalo, Rochester & Pittsburgh.....	1,508	481,372	263,128	744,500	1,245,500	148,518	129,570	278,088	407,588	407,588	170,966	113,034
Central of Georgia.....	1,916	716,406	319,961	1,036,367	1,756,334	107,434	129,947	237,381	357,321	357,321	314,567	113,034
Chicago & Alton.....	988	673,434	319,961	993,395	1,676,789	107,434	129,947	237,381	357,321	357,321	314,567	113,034
Chicago & Eastern Illinois.....	988	778,037	319,961	1,097,998	1,897,958	107,434	129,947	237,381	357,321	357,321	314,567	113,034
Chicago & North Western.....	7,635	3,394,607	1,398,726	4,793,333	8,192,940	525,276	645,741	1,171,017	1,796,758	1,796,758	2,000,523	55,405
Chicago, Burlington & Quincy.....	9,023	4,553,559	1,604,778	6,158,337	11,712,337	525,276	645,741	1,171,017	1,796,758	1,796,758	2,000,523	55,405
Chicago, St. Paul, Minn. & Omaha.....	1,730	723,568	348,010	1,071,578	1,819,598	79,716	134,429	214,145	348,575	348,575	219,294	96,655
Colorado & Southern.....	1,245	656,258	106,088	762,346	1,264,692	79,716	134,429	214,145	348,575	348,575	219,294	96,655
El Paso Southwestern.....	1,867	524,176	79,067	603,243	1,002,490	68,122	73,901	142,023	241,924	241,924	150,106	420,213
Erie.....	1,902	2,524,176	618,803	3,142,979	5,691,782	285,798	627,365	913,163	1,538,523	1,538,523	1,538,523	636,261
Grand Rapids & Indiana.....	1,590	228,001	110,823	338,824	568,824	42,181	55,439	97,620	147,659	147,659	95,238	19,038
Guif. Colorado & Santa Fe.....	1,518	965,559	291,846	1,257,405	2,214,860	154,149	207,335	361,484	568,824	568,824	361,484	19,038
Illinois Central.....	4,518	3,324,285	950,479	4,274,764	8,549,249	389,945	948,549	1,338,494	2,277,043	2,277,043	2,277,043	301,452
Kansas City Southern.....	1,827	530,597	123,144	653,741	1,103,935	71,600	82,587	154,187	233,787	233,787	154,187	92,524
Lehigh Valley.....	1,446	2,234,570	891,275	3,125,845	5,256,390	289,167	522,887	812,054	1,334,941	1,334,941	1,334,941	4,389
Louisville & Nashville.....	4,388	2,827,039	895,051	3,722,090	7,449,180	396,364	691,050	1,087,414	1,784,768	1,784,768	1,784,768	1,074,216
Maine Central.....	931	388,057	667,783	1,055,840	1,443,890	64,650	106,026	170,676	276,696	276,696	117,949	19,689
Missouri, Kansas & Texas.....	3,072	1,402,990	667,783	2,070,773	4,138,563	297,101	315,828	612,929	928,757	928,757	928,757	39,878
Mobile & Ohio.....	926	653,778	111,673	765,451	1,340,676	99,444	172,906	272,350	465,250	465,250	231,953	59,092
New York, Ontario & Western.....	546	529,873	156,393	686,266	1,172,566	54,698	125,650	180,348	275,998	275,998	180,348	33,188
Norfolk & Western.....	1,921	2,000,319	296,722	2,297,041	4,594,082	273,507	395,975	669,482	1,065,457	1,065,457	1,065,457	142,029
Norfolk Central.....	463	720,324	156,393	876,717	1,553,434	35,174	297,162	332,336	629,502	629,502	332,336	17,652
Pennsylvania Co. R.....	1,414	2,315,927	569,553	2,885,480	5,771,460	300,139	525,385	825,524	1,350,909	1,350,909	1,350,909	533,050
Pere Marquette.....	4,024	8,780,180	2,310,713	11,090,893	22,181,683	1,477,911	2,458,822	3,936,733	6,394,565	6,394,565	6,394,565	83,352
Phila., Balt. & Wash.....	2,354	637,217	571,812	1,209,029	2,416,049	90,996	294,233	385,229	679,462	679,462	385,229	27,254
Pitts., Cin. & St. Louis.....	1,471	1,838,026	551,639	2,389,665	4,777,730	204,968	471,691	676,659	1,148,350	1,148,350	1,148,350	403,260
Texas & Pacific.....	1,885	1,015,302	387,877	1,403,179	2,806,358	124,810	154,782	279,592	454,372	454,372	279,592	65,611
Toledo, St. Louis & Western.....	1,451	235,618	36,432	272,050	544,100	109,638	116,352	225,990	342,342	342,342	225,990	31,296
Tulsa.....	829	481,696	178,435	660,131	1,319,266	44,132	65,009	109,141	174,151	174,151	109,141	79,470
West Jersey & Seashore.....	363	320,125	156,035	476,160	952,290	40,065	104,781	144,846	249,626	249,626	144,846	81,977
Wheeling & Lake Erie.....	442	972,792	34,878	1,007,670	2,044,940	50,464	88,383	138,847	227,231	227,231	138,847	8,199
Wisconsin Central.....	1,023	401,340	111,013	512,353	1,023,366	50,464	88,383	138,847	227,231	227,231	138,847	8,199
Yazoo & Mississippi Valley.....	1,370	833,663	247,645	1,081,308	2,162,973	110,861	148,091	258,952	406,943	406,943	258,952	79,032
Atchison, Topeka & Santa Fe.....	7,458	\$2,779,944	\$9,197,468	\$37,927,561	\$49,977,373	\$4,781,820	\$2,997,400	\$7,779,220	\$10,778,620	\$10,778,620	\$10,778,620	\$2,084,619
Atlantic Coast Line.....	4,408	8,620,554	2,734,665	12,355,219	24,105,823	1,754,756	1,809,760	3,564,516	5,374,276	5,374,276	5,374,276	685,753
Buffalo, Rochester & Pittsburgh.....	1,508	3,080,477	486,542	3,567,019	7,134,038	519,548	859,844	1,379,392	2,239,242	2,239,242	2,239,242	288,883
Central of Georgia.....	1,916	3,956,547	1,514,115	5,470,662	10,941,324	819,646	1,077,248	1,896,894	2,974,142	2,974,142	2,974,142	378,883
Chicago & Alton.....	988	4,093,176	2,084,221	6,177,397	12,354,614	613,891	995,807	1,609,698	2,605,495	2,605,495	2,605,495	325,044
Chicago & Eastern Illinois.....	988	4,154,478	901,107	5,055,585	10,111,170	613,891	995,807	1,609,698	2,605,495	2,605,495	2,605,495	325,044
Chicago & North Western.....	7,635	23,227,764	9,428,673	32,656,437	65,314,110	4,307,175	8,816,693	13,123,868	21,940,531	21,940,531	21,940,531	2,753,788
Chicago, Burlington & Quincy.....	9,023	27,446,875	10,763,428	38,210,303	76,427,126	6,370,643	10,596,902	16,967,545	27,564,447	27,564,447	27,564,447	3,463,465
Chicago, St. Paul, Minn. & Omaha.....	1,730	4,453,970	2,215,269	6,669,239	13,338,468	570,709	754,523	1,325,232	2,100,761	2,100,761	2,100,761	263,662
Colorado & Southern.....	1,245	3,448,877	865,557	4,314,434	8,629,261	408,904	472,660	981,564	1,464,224	1,464,224	1,464,224	183,163
El Paso Southwestern.....	1,867	2,786,521	467,761	3,254,282	6,509,063	240,503	450,227	690,730	1,140,957	1,140,957	1,140,957	148,335
Erie.....	1,902	16,412,550	4,363,974	20,776,524	41,551,024	1,254,219	3,211,191	4,465,410	6,716,601	6,716,601	6,716,601	863,895
Grand Rapids & Indiana.....	1,590	1,233,500	903,074	2,136,574	4,279,648	1,020,230	1,140,973	2,161,203	3,322,176	3,322,176	3,322,176	425,389
Guif. Colorado & Santa Fe.....	1,518	5,123,347	1,575,067	6,698,414	13,396,828	3,403,774	6,308,400	9,712,174	15,024,574	15,024,574	15,024,574	1,938,950
Illinois Central.....	4,518	18,445,068	5,754,350	24,199,418	48,398,836	484,618	515,470	1,000,088	1,515,166	1,515,166	1,515,166	193,979
Kansas City Southern.....	1,827	3,335,907	687,504	4,023,411	8,046,822	1,769,486	3,183,147	4,952,633	7,715,780	7,715,780	7,715,780	983,500
Lehigh Valley.....	1,446	14,730,885	5,995,624	20,726,509	41,457,313	2,692,881	4,011,854	6,704,735	10,416,569	10,416,569	10,416,569	1,333,662
Louisville & Nashville.....	4,388	16,420,604	5,995,624	22,416,228	44,832,452	1,712,535	2,704,091	4,416,626	6,832,651	6,832,651	6,832,651	863,895
Maine Central.....	931	6,301,754	3,703,611	10,005,365	20,011,120	1,736,551	2,004,091	3,740,642	5,744,733	5,744,733	5,744,733	734,634
Missouri, Kansas & Texas.....	3,072	3,602,700	953,370	4,556,070	9,112,140	478,046	725,299	1,203,345	1,828,644	1,828,644	1,828,644	231,173
Mobile & Ohio.....	926	3,900,293	1,851,370	5,751,663	11,503,326	1,602,544	2,438,248	4,040,792	6,079,040	6,079,040	6,079,040	771,554
New York, Ontario & Western.....	546	2,950,926	1,056,747	4,007,673	8,015,349	359,008	1,248,341	1,607,349	2,465,690	2,465,690	2,465,690	311,505
Norfolk & Western.....	1,921	12,959,367	3,569,986	16,529,353	33,058,706	1,827,494	3,213,932	5,041,426	7,865,358	7,865,358	7,865,358	1,000,523
Norfolk Central.....	463	16,902,670	5,080,455	21,983,125	43,966,250	860,826	1,042,300	1,903,126	2,945,426	2,945,426	2,945,426	371,512
Pennsylvania Co. R.....	1,414	50,750,560	1,900,631	52,651,191	105,301,781	1,735,110	2,438,248	4,173,358	6,351,616	6,351,616	6,351,616	803,902
Pere Marquette.....	4,024	4,028,702	3,486,819	7,515,521	15,031,040	1,735,110	2,438,248	4,173,358	6,351,616	6,351,616	6,351,616	803,902
Phila., Balt. & Wash.....	2,354	1,402,890	650,100	2,052,990	4,105,980	260,740	2,834,866	3,095,606	4,930,466	4,930,466	4,930,466	623,632
Pitts., Cin. & St. Louis.....	1,471	11,375,890	3,650,100	15,025,990	30,051,980	821,755	1,093,534	1,915,289	2,936,823	2,936,823	2,936,823	371,512
Texas & Pacific.....	1,885	2,617,524	1,060,852	3,678,376	7,356,752	92,000	1,093,534	1,285,534	2,019,068	2,019,068	2,019,068	257,559
Toledo, St. Louis & Western.....	431	2,617,524	1,060,852	3,678,376	7,356,752	92,000	1,093,534	1,285,534	2,019,068	2,019,068	2,019,068	257,559
Tulsa.....	829	2,617,524	1,060,852	3,678,376	7,356,752	92,000	1,093,534	1,285,534	2,019,068	2,019,068	2,019,068	257,559
West Jersey & Seashore.....	363	2,770,903	1,885,526	4,656,429	9,341,852	270,420	663,844	934,264	1,404,704	1,404,704	1,404,704	179,978
Wheeling & Lake Erie.....	442	2,340,660	2,700,442	5,041,102	10,082,202	145,728	1,336,814	1,482,542	2,279,360	2,279,360	2,279,360	291,002
Wisconsin Central.....	1,023	2,761,660	867,559	3,629,219	7,258,438	50,464	88,383	138,847	227,231	227,231	138,847	8,199

## Car Surpluses and Shortages.

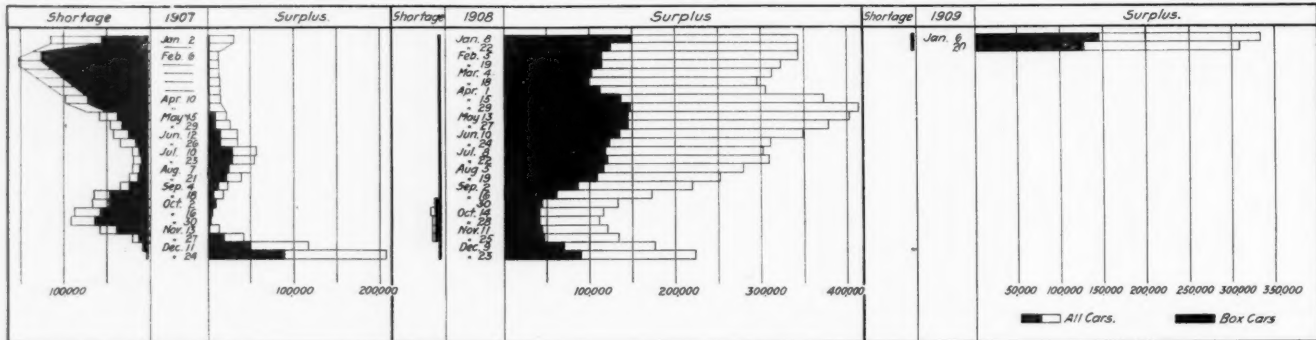
Arthur Hale, Chairman of the Committee on Car Efficiency of the American Railway Association, in presenting bulletin No. 39-A, giving a summary of car surpluses and shortages by groups from December 24, 1907, to January 20, 1909, says:

"This report shows a decrease of 21,355 surplus available cars, bringing the total down to 311,664. The decrease is nearly all accounted for by the increased demand for box cars, there having been 19,051 of this class of cars restored to service since our last report. The continuation of mild weather has had an unfavorable effect on the coal business, and there was a decrease of only 1,000 in the number of surplus coal and gondola cars.

asked, was it probable that a lakes-to-the-gulf deep waterway and the Panama canal would be so used? He thought the first thing to do was to show that there would be commerce to move over the proposed waterways. Then, there is no doubt, they would be provided. He thought the advocates of waterways were over-enthusiastic regarding the immediate results that would be secured by their construction.

## Recommendations of Wisconsin Railroad Commission.

In its annual report transmitted to the Governor December 7, the Wisconsin Railroad Commission recommends that all crossings of steam railways with one another, of steam and



Car Surpluses and Shortages in 1907, 1908 and 1909.

"The most improvement is noted in Groups 2 (Eastern) and 6 (Northwestern), although Groups 4 (North Atlantic), and 5 (Southern), show a fair percentage of decrease, as does also Group 9 (Southwestern). There are slight increases in Groups 1 (New England), 8 (Middle Western) and 11 (Canadian). There is also a decrease of about 3,000 in the number

electric railways, and of steam and electric railways with highways, be placed under control of the Commission, so as to permit uniform and consistent action in solving the difficulties connecting with crossings. The act requiring public service corporations to get a certificate of "convenience and necessity" before building new properties should be amended so

CAR SURPLUSES AND SHORTAGES, FROM DECEMBER 24, 1907, TO JANUARY 20, 1909, INCLUSIVE.

Date.	Number of roads.	Surpluses.				Shortages			
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.
January 20, 1909.....	162	127,104	26,723	116,180	41,057	163	21	139	35
January 6, 1909.....	156	146,255	25,383	117,686	43,695	170	202	120	14
December 23, 1908.....	158	87,350	16,247	79,595	38,885	471	42	289	217
December 9, 1908.....	161	67,550	15,336	58,816	33,941	1,134	73	276	196
November 25, 1908.....	160	45,194	12,157	43,854	31,624	7,923	178	900	209
October 28, 1908.....	158	39,383	10,185	31,541	29,803	8,175	107	2,261	236
September 30, 1908.....	160	42,593	10,365	49,795	31,039	7,313	450	224	127
August 19, 1908.....	160	106,367	13,494	92,500	40,642	465	90	105	194
July 22, 1908.....	166	120,580	14,401	125,739	47,960	115	37	330	27
June 24, 1908.....	163	123,112	18,042	130,149	41,995	266	34	120	31
May 27, 1908.....	160	144,697	20,075	162,695	54,437	82	13	12	18
April 29, 1908.....	159	147,971	24,350	186,742	59,542	145	42	16	64
March 18, 1908.....	160	103,509	25,122	119,205	49,206	533	151	250	73
February 19, 1908.....	161	113,776	30,088	134,217	44,432	697	141	249	162
January 22, 1908.....	161	124,622	27,328	142,388	48,292	392	132	79	135
December 24, 1907.....	158	87,714	14,740	64,556	42,300	187	81	191	265
					209,310				724

of bad order cars. This item has now been reduced to normal on a number of the more important systems."

The accompanying table shows the surpluses and shortages for the period covered by the report, and the chart shows the surpluses and shortages in 1907, 1908 and 1909.

## Should the Mississippi be Deepened?

At the dinner of the Traffic Club of Chicago on the evening of January 27, Congressman Joseph E. Ransdell, of Louisiana, advocated a bond issue by the federal government of \$500,000,000 for the development of internal waterways, not more than \$50,000,000 a year to be issued. But another speaker, William J. Calhoun, who was President McKinley's special commissioner to South America, called attention to the fact that American merchants and steamships do not make use of the waterways already available. He said that there is only one through direct steamship line operating between the United States and South America, and this is owned by an Englishman in Venezuela. Since the Atlantic ocean, which had been provided by nature, is not used to handle the commerce of the United States with South America, Mr. Calhoun

as to permit the Commission to consider the financial ability of the applicant. The Commission asks that its authority be extended over demurrage charges. With reference to advances in railway rates, the Commission says:

"Since under the railway law (of Wisconsin) the companies establish rates and classifications in the first instance, the Commission cannot assume jurisdiction and hear complaints before such modified rules, regulations or classifications effecting an advance in rates have actually gone into effect. The suggestion of requiring application on the part of railway companies to the public administrative body before a proposed advance in rates can take effect has been considered by the Interstate Commerce Commission as well as by some of the state commissions. The merits of such a plan deserve careful consideration. It is clearly complicated with grave objections. We have serious doubts regarding its feasibility or practicability. It is possible that an increase in the length of time from ten to thirty days before a proposed advance in rates or a change of classifications, rules and regulations resulting in an advance in rates can take effect may meet the situation fairly well. At the present time every change in rates (in Wisconsin) requires ten days' notice unless authorized otherwise. This appears to be ample notice for reduc-



tion, but it is probable that ordinarily thirty days' notice for advances in rates is not too long."

The Commission says that during the year 16 complaints relating to excessive freight charges were filed, which were heard, and 10 decisions were rendered ordering refunds. "Many complaints," the Commission adds, "were the result of a lack of ordinary care and diligence on the part of shippers."

## Railroad Officers.

### ELECTIONS AND APPOINTMENTS.

#### Executive, Financial and Legal Officers.

W. B. Pollock has been elected Vice-President and General Manager of the Western Transit Co. and the Rutland Transit Co., with office at New York.

L. C. Gilman, formerly Attorney for the Great Northern, at Seattle, Wash., has been appointed Assistant to the President, with office at St. Paul, Minn.

L. J. Storey, Commissioner on the Board of Railway Commissioners of Texas, has been elected Chairman, succeeding Allison Mayfield, who remains a Commissioner.

F. W. Estabrook has been elected President of the St. Paul & Des Moines, succeeding G. A. W. Dodge, resigned. F. C. MacMillan, General Manager, has been elected also Vice-President.

H. H. Laughton, auditor of disbursements of the Southern Railway, has been appointed Auditor, with office at Washington, D. C., succeeding C. B. Hayes, resigned to accept promotion elsewhere.

E. N. Brown, President of the National Lines of Mexico, has been elected President of the National Railways of Mexico, which has taken over the operation of the National Lines of Mexico, the Mexican Central and other merged companies.

Lloyd E. Stafford, whose appointment as Auditor of the Orange & Northwestern has been announced in our columns, was born at Washington, La., on September 8, 1884. After an education in the public schools at Washington, he began railway work in November, 1902, as a clerk in the freight offices of the Morgan's Louisiana & Texas, at Morgan City, La. In May, 1903, he became agent and operator, and in December, 1907, was appointed local agent of the St. Louis & San Francisco, at Opelousas, La. On March 3, 1908, he was transferred to Eunice, La., as joint agent of the Chicago, Rock Island & Pacific and the St. Louis & San Francisco, and in November, 1908, was made Traveling Auditor of the St. Louis & San Francisco. His appointment as Auditor of the Orange & Northwestern was made on January 1, 1909.

#### Operating Officers.

Ernest Stenger, General Superintendent of the Rio Grande Western and the San Pete Valley, has resigned.

Raffe Emerson has been appointed Assistant to the General Manager of the Lehigh Valley, with office at South Bethlehem, Pa.

H. M. Taylor, formerly General Manager of the Interoceanic of Mexico, has been appointed General Manager of the Mexican Central, succeeding J. N. Galbraith.

W. C. Park has been appointed Superintendent of the New Orleans Great Northern, with office at Florenceville Junction, Miss. The office of Superintendent has been unfilled for some months.

J. W. Metcalf, Assistant Superintendent of the Los Angeles division of the Southern Pacific, has been transferred to the Tucson division. A. M. Jamison, chief clerk in the office of the General Superintendent, succeeds Mr. Metcalf.

C. M. Bryant, Trainmaster of the Dallas division of the Kansas City, Mexico & Orient of Texas, at Denison, Tex., has been appointed Superintendent of the Southern division, at Smithville, Tex., succeeding T. A. Wilson, resigned. George Spooner succeeds Mr. Bryant.

G. H. Olmstead, Superintendent of the Idaho division of the Oregon Short Line, who has been on a leave of absence on account of ill health since last November, has been appointed Superintendent of the Montana division, at Pocatello, Idaho, succeeding W. R. Armstrong, who has been Acting Superintendent of that division. W. H. Jones, Acting Superintendent of the Idaho division during Mr. Olmstead's absence, has been appointed Superintendent of that division, at Pocatello. W. R. Armstrong has been appointed Assistant Superintendent of the Idaho division, at Nampa, Idaho.

#### Traffic Officers.

L. R. Hayes has been appointed Commercial Agent of the Pere Marquette at Chicago.

Charles M. Davis has been appointed Soliciting Freight Agent of the Missouri Pacific, at Kansas City, Mo.

J. B. McGuire has been appointed Division Agent of the Chicago, Rock Island & Pacific, at Rock Island, Ill.

J. N. Anderson has been appointed Immigration Agent of the Missouri Pacific, succeeding T. C. Kimber, promoted.

A. W. Randall has been appointed Traveling Freight and Passenger Agent of the Chicago, Rock Island & Pacific, at Salt Lake City, Utah.

W. A. Scrivner has been appointed Commercial Agent of the Trinity & Brazos Valley at Fort Worth, Tex., succeeding J. B. Tewsberry, resigned.

S. C. Nash, Acting General Agent of the Texas & Pacific, at Los Angeles, Cal., has been appointed General Agent, succeeding T. D. Connelly, deceased.

F. D. Colby has been appointed Special Agent of the Coal Traffic department of the New York Central Lines East of Buffalo, N. Y., with office at New York.

R. C. Caples has been appointed General Agent of both Freight and Passenger departments of the New York Central Lines both east and west of Buffalo, N. Y., at New York.

Warren H. Miller, Soliciting Freight Agent of the Seaboard Air Line, at Memphis, Tenn., has been appointed Contracting Freight Agent, at St. Louis, Mo. Edgar Estile succeeds Mr. Miller.

H. A. Noble has been appointed Division Freight Agent of the Boston & Albany, at Pittsfield, Mass., succeeding G. C. Woodruff, who has been transferred to the New York Central & Hudson River.

Since the resignation of S. P. Shane, Freight Traffic Manager of the Erie, previously noted in these columns, the duties of freight traffic manager have been assumed by H. B. Chamberlain, Vice-President.

J. A. Martin, Commercial Agent of the Iowa Central and the Minneapolis & St. Louis, at St. Louis, Mo., has been appointed General Eastern Agent, with office at New York, succeeding E. B. Johns, resigned.

A. S. McAlexander, whose resignation as Commercial Agent of the Clyde-Charleston Fast Freight Lines has been announced in these columns, is now Vice-President of J. B. Wilkes & Co., incorporated grain dealers, Nashville, Tenn.

J. N. Stewart, formerly Assistant Advertising Agent of the Atchison, Topeka & Santa Fe and of the Chicago, Rock Island & Pacific, at Chicago, has been appointed General Advertising Agent of the Northern Pacific, with office at St. Paul, Minn.

W. H. Porter, Commercial Agent of the Boston & Albany, at Boston, Mass., has been granted leave of absence on account of ill health, and his duties are temporarily assumed by E. P. Gardiner, Commercial Agent of the New York Central Lines, at Boston.

#### Engineering and Rolling Stock Officers.

A. D. Page, Principal Assistant Engineer of the Chicago, Rock Island & Pacific, has resigned.

George F. Hennessey has been appointed Roundhouse Foreman of the Chicago, Milwaukee & St. Paul, at Janesville, Wis.

E. T. Reister has been appointed Division Engineer of the

Lehigh Valley, at Auburn, N. Y., succeeding F. K. Bennett, resigned.

T. McHattie, Master Mechanic of the Grand Trunk at Montreal, Que., has been appointed Superintendent of Motive Power of the Central of Vermont.

O. Suthards has been appointed General Tie and Timber Inspector of the Missouri Pacific, succeeding W. T. Schultz, resigned to accept service with another road.

J. B. Berry, Chief Engineer of the Chicago, Rock Island & Pacific, has been appointed also Supervising Engineer of the St. Louis & San Francisco, with office at St. Louis, Mo.

F. J. Marcheck, Signal Supervisor of the Houston division of the Galveston, Harrisburg & San Antonio, has been appointed District Signal Foreman of the Houston division. P. V. Wright succeeds Mr. Marcheck.

B. J. Peasley, Master Mechanic of the St. Louis, Iron Mountain & Southern, at Ferriday, La., has been appointed Master Mechanic at De Soto, Mo., succeeding P. J. Conrath, resigned. W. S. Kenyon succeeds Mr. Peasley.

M. C. Byers, Engineer of Maintenance of Way of the St. Louis & San Francisco, has been appointed Chief Engineer, succeeding J. F. Hinckley, resigned. The position of Engineer of Maintenance of Way has been abolished.

R. G. Cullivan, General Foreman, Locomotive department, of the New York Central & Hudson River, at West Albany, N. Y., has been appointed Division Superintendent of Motive Power, at West Albany, succeeding E. A. Walton.

J. E. Irwin, Master Mechanic of the Marietta, Columbus & Cleveland, has resigned to become Superintendent of Equipment of the Indian Refining Co., Georgetown, Ky., and Lawrenceville, Ind., and the position of Master Mechanic has been abolished.

Louis C. Fritch, Assistant to the President of the Illinois Central, has been appointed Consulting Engineer, in charge of electrification work, of the Illinois Central, the Indianapolis Southern and the Yazoo & Mississippi Valley, with office at Chicago, succeeding L. T. Moore, who continues as Chairman of the Board of Pensions. Donald Rose, General European Agent, succeeds Mr. Fritch.

W. M. Post, Assistant Supervisor of Signals of the Pennsylvania, at Pittsburgh, Pa., has been appointed Supervisor of Signals of the Chautauqua division, with office at Oil City, Pa.; G. E. McFarland, Assistant Supervisor of Signals at Altoona, Pa., has been appointed Supervisor of Signals of the Buffalo division, with office at Olean, N. Y.; J. H. Broadbent, Assistant Supervisor of Signals at Kittanning, has been appointed Supervisor of Signals of the Allegheny division, with office at Kittanning, Pa., and his former office has been abolished.

#### Storekeeper.

John J. Goodwin, General Storekeeper of the International & Great Northern, with office at Palestine, Tex., has resigned.

#### OBITUARY.

E. F. Hogle, Assistant Superintendent of the St. Louis & San Francisco, at Birmingham, Ala., died in Mexico January 20.

G. W. Kaiser, formerly Assistant Master Mechanic of the Juniata Shops of the Pennsylvania, died last week at his home in New York.

William Whyte, formerly Trainmaster and Superintendent of the Texas & New Orleans, died on January 28, at Dallas, Tex. He was 54 years of age.

T. S. Reilly, Superintendent of the Mechanical Department of the Canton-Hankow Railway, and formerly Mechanical Editor of the Railway & Engineering Review, died in China, on January 30.

A. B. Garner, formerly Vice-President and Treasurer of the Murphy Varnish Co., of Newark, N. J., and at one time Purchasing Agent of the Denver & Rio Grande, died at his home in New York January 28.

## Railroad Construction.

### New Incorporations, Surveys, Etc.

**BIG BEND TRANSIT COMPANY.**—This company has obtained the greater part of right of way from Spokane, Wash., west along the Little Spokane river as far as Metre rapids. Grading has been completed for seven miles on the western end. Reference was made to this company in our issue of January 8 in connection with the Spokane & Inland Empire, to the effect that terminal rights were granted the Transit company by the Department of the Interior some time ago, but upon the rights lapsing, the Spokane & Inland Empire filed an application for the same site. This item was incorrect in saying that the rights of the Big Bend Transit Co. had lapsed. The company is now applying for additional terminal rights. Wm. A. Nichols, 105 Howard street, Spokane, Wash., President.

**CHICAGO, ROCK ISLAND & PACIFIC.**—Press reports say that this company is about to lay out large yards and terminals at Hulburt, Ark., which is six miles west of Memphis, Tenn. The yards are to cover about six acres of ground. The estimated cost of the improvement is \$5,000,000. The report says that repair shops are to be put up, and a large brick and frame hotel, for the accommodation of the 400 shop employees.

**COPPER RIVER RAILWAY.**—Press reports indicate that announcement has been made of the completion of this line from Cordova, Alb., through a point above the Abercrombie rapids of the Copper river. The Tidewater terminus is said to be located at Three Tree Point, just north of Cordova, where wharves have been built. (Nov. 13, p. 1773.)

**GRAND TRUNK PACIFIC.**—The following lines are to be built by this company in Saskatchewan and subsidized by the Provincial government at \$15,000 per mile:

From near Township 22, range 6, to Yorktown, 40 miles.

From a point on the main line between the 108th and 109th parallels to Battleford, 45 miles.

From near Township, 22, range 6, to Regina, Sask., about 110 miles. This will give a direct line from Regina to Yorktown, via Melville.

**GREAT NORTHERN.**—The Midland of Manitoba will ask the Manitoba legislature for power to construct, in connection with the authorized line between Winnipeg and the International boundary, a branch line from a point on the east side of the Red river in Township 1, range 2 or 3 east, to a point on the International boundary, on the west side of the river in range 2, and authorizing the company to sell to another company its lines from Gretna, Man., north to Portage la Prairie and from Morden south to the international boundary.

Application will also be made to incorporate a company with power to acquire and operate the existing constructed lines of the Midland of Manitoba in Manitoba (those above mentioned) and with power to construct lines of railway from Winnipeg, Man., in a general westerly direction to Brandon, thence westerly to a point near Elkhorn and thence to the western boundary of the province; from Morden in a north-westerly direction to a point near Rathwell, thence north-westerly to a point on the first mentioned line running westerly from Winnipeg. Fisher, Wilson, Battam & Hamilton, Winnipeg, Man., are the solicitors for the applicants.

**MIDLAND OF MANITOBA.**—See Great Northern.

**NEW YORK, PHILADELPHIA & NORFOLK.**—See Pennsylvania.

**NORTHERN PACIFIC.**—Press reports from Winnipeg, Man., say that as soon as weather permits the company will commence work on the line due south from Winnipeg, to the international boundary, and also that the line from the boundary to St. Paul, Minn., will be relaid with 90-lb. rails, and as soon as this work is completed fast trains will be run between Winnipeg and St. Paul.

**OKLAHOMA ROADS.**—The Miller Lumber Co., Millerton, Okla., is building a standard gage line from Millerton, on the St. Louis & San Francisco, north for about 15 miles. This road is being built for use as a logging road at present, but it is intended that it shall be a public carrier eventually.

**ORANGE & NORTHWESTERN.**—See St. Louis & San Francisco.



**PENNSYLVANIA.**—With a view to further completing the four-tracking of the line from Altoona, Pa., to Pittsburgh, bids have been asked for widening the stone arch bridge over the Conemaugh river, just west of South Fork, on the Pittsburgh division, to hold four tracks instead of three as at present. This is the first piece of new construction work authorized by the Pennsylvania for more than a year. The addition to the South Fork bridge will increase its width from 38 ft. to 58 ft. The work will necessitate the excavation of 1,500 cu. yds. of earth for the foundations. The construction itself will require 5,500 cu. yds. of stone masonry.

The New York, Philadelphia & Norfolk is building three miles of second track between Keller, Va., and Olney. Recent reports to the effect that this company is about to build new freight yards at Cape Charles, Va., are incorrect.

**PHILADELPHIA & READING.**—Press reports say that this company began operating passenger trains recently over a portion of the elevated line on Ninth street, Philadelphia. The northbound track between Columbia avenue and Huntingdon street is finished, and the southbound track will be ready soon. The next section between Columbia avenue and Spring Garden street is also to be finished soon. The completion of this work will eliminate about a dozen dangerous grade crossings. (Aug. 21, p. 788.)

**PORT O'CONNOR, RIO GRANDE & NORTHERN.**—Press reports from San Antonio, Tex., indicate that the Port O'Connor syndicate of The Hague, through their American representatives, have made an agreement for building the road from Port O'Connor, Tex., on the Gulf Coast, north to San Antonio, about 234 miles. The estimated cost is said to be \$5,000,000.

**ST. LOUIS & SAN FRANCISCO.**—B. F. Yoakum is quoted as saying that negotiations are under way for an extension of the Orange & Northwestern, now in operation from Orange, Tex., north to Newton, 61 miles, from the latter place north to Logansport, La., about 80 miles.

**SPOKANE & INLAND EMPIRE.**—See Big Bend Transit Co.

**SUPERIOR & WESTERN ONTARIO.**—Application will be made to the Canadian Parliament for the incorporation of this company, which intends to build a line of railway from a point on the Lake Superior branch of the Grand Trunk Pacific, about 154 miles northwest of Fort William, Ont., to a point on the same line north of Sturgeon lake. McDougall & Honeywell, Ottawa, solicitors.

**SUSQUEHANNA RAILWAY, LIGHT & POWER COMPANY.**—This company, which owns the Lancaster, Pa., trolley lines, has purchased the property and franchises of the Philadelphia, Coatesville & Lancaster Street Railway for \$137,500. The latter company has a line in operation between Coatesville, Pa., and Parkesburg. The new owners will begin construction at once of the line between Christiana, Pa., and Parkesburg, which will give through trolley service between Lancaster and Coatesville.

**TEHUANTEPEC NATIONAL.**—It is reported from the City of Mexico that S. Pearson & Son, Ltd., London, England, who are operating this road, are interested in the proposed line from San Geronimo, Vera Cruz, southeast through the states of Vera Cruz and Chiapas, and northeast through the states of Tabasco, Campeche and Yucatan to Merida, about 450 miles. The Mexican government is said to have recently granted a concession for building the mountain division of this proposed line. It is provided in this concession that this division, about 80 miles long, is to be operated by electricity. It is said that a thorough investigation by experts shows that the division which runs across the mountains can be operated more economically and to better advantage by electricity than by steam. This division will extend between San Cristobal, Chiapas, and Tuxtla. A portion of the country through which the line will pass is very rough and it is said that serious engineering and construction difficulties will be encountered.

**TOLEDO & MICHIGAN.**—Considerable work is being done on the line of this company which extends from Adrian, Mich., through Clayton, Hudson, Pittsford, Osseo, Hillsdale, Janesville, Quincy and Coldwater, about 60 miles. The roadbed has been graded for a distance of about 32 miles and a number of concrete culverts and bridges have been built. This line will

parallel that of the Lake Shore & Michigan Southern, which passes through the same town. The authorized capital stock of this company is \$1,500,000. P. T. Duket, President, Ohio building, Toledo, Ohio.

**WISCONSIN CENTRAL.**—President Newman Erb announces that plans to shorten the main line between Chicago, Minneapolis and St. Paul are under way. It is said that the road eventually will build a new cut-off from Mukwonago, Wis., on the main line west of Milwaukee to Grand Rapids, 135 miles, and from Spencer, Wis., to Owen, 15 miles. This would connect with the present main line by the Portage and Grand Rapids branches and would reduce the distance between Chicago and St. Paul 45 miles. Mr. Erb, while admitting that the road considered building cut-offs and that it has surveyors in the field, declined to say if the cut-offs described were the ones contemplated.

**YAQUI LAND & WATER COMPANY.**—Incorporated in New Jersey, with a capital stock of \$15,000,000, to build a line of railway from a point on the Gulf of California in Mexico to a point either in the state of Sonora or Chihuahua. The incorporators include E. L. Gruber, T. J. Regan, C. W. Davis and J. R. Turner. The principal offices are at 15 Exchange place, Jersey City, N. J.

## Railroad Financial News.

**ATLANTA, BIRMINGHAM & ATLANTIC.**—The receivers have been authorized to issue \$184,000 notes to pay installments of \$60,000 and \$80,000 that fell due on the first of last November and the first of last January respectively, being the principal of equipment trust notes.

**BOSTON & MAINE.**—John L. Billard, who some months ago bought \$11,000,000 stock of the Boston & Maine, which the New York, New Haven & Hartford sold, has asked the Connecticut legislature to approve the incorporation of the Billard Company. The Billard Company is to have power to buy and sell or hold stock of the Boston & Maine.

**CUBA EASTERN.**—The property of this company, the Northeastern Cuba, Cuba Eastern Terminals and the Eastern of Cuba is to be acquired by a new corporation which will issue \$600,000 first mortgage 6 per cent. 20-year bonds; \$2,750,000 first preferred 7 per cent. non-cumulative stock; \$250,000 second preferred 5 per cent. non-cumulative stock, and \$2,750,000 common stock; these securities to be exchanged for the outstanding securities of the four companies. There are \$4,927,000 first mortgage bonds of the four companies and \$221,000 debentures outstanding in the hands of the public, and \$8,200,000 stock outstanding.

**CUBA EASTERN TERMINALS.**—See Cuba Eastern.

**EASTERN OF CUBA.**—See Cuba Eastern.

**LOUISVILLE & NASHVILLE.**—The \$23,000,000 collateral trust bonds of 1903-1923, redeemable after 1908, are to be paid off April 1 from the proceeds of a sale by the company to J. P. Morgan & Co., New York, of collateral aggregating \$29,864,000. This collateral was held as security for the bonds.

**METROPOLITAN STREET RAILWAY.**—On January 28, Judge Lacombe, in the United States Circuit Court, ordered the foreclosure sale of the property of this New York street railway company under the general collateral trust mortgage unless interest is paid within 20 days.

The suit brought against Thomas F. Ryan, H. H. Vreeland and other directors charged with fraudulent acts in connection with the affairs of the company has been dismissed.

**NEW YORK CENTRAL & HUDSON RIVER.**—This company has been given permission by the New York Public Service Commission, Second district, to buy the stock of the Spuyten Duyvil & Port Morris Railroad at a price not to exceed \$230 a share. The Spuyten Duyvil road, running from Spuyten Duyvil, N. Y., to Mott Haven, six miles, has been leased to the New York Central & Hudson River since 1871, the Central paying 8 per cent. dividends on its stock.

**NORTHEASTERN CUBA.**—See Cuba Eastern.

## Equipment and Supplies.

### LOCOMOTIVE BUILDING.

Walter H. Gahagan has ordered two locomotives from the Baldwin Locomotive Works.

The Erie & Michigan Railway & Navigation Co. has ordered one locomotive from the American Locomotive Co.

The Grand Trunk Pacific has ordered 25 mogul locomotives from the Canadian Locomotive Co., Kingston, Ont.

The Chesapeake & Ohio has ordered 15 locomotives from the American Locomotive Co. and has an option on 15 more.

The Wenatchee Valley & Northern, under construction in Washington, has ordered one locomotive from the Baldwin Locomotive Works.

The Iowa Central, reported in the *Railroad Age Gazette* of January 22 as being in the market for from 15 to 30 locomotives, is now asking prices on 12 locomotives.

The Atchison, Topeka & Santa Fe has ordered two Mallet compound passenger locomotives and two Mallet compound freight locomotives from the Baldwin Locomotive Works.

### CAR BUILDING.

The Minneapolis & St. Louis is in the market for 100 freight cars.

The Chicago, Burlington & Quincy is in the market for 31 passenger cars, including 26 coaches.

The San Antonio Traction Co., San Antonio, Tex., will place an order soon for ten semi-convertible cars for early delivery.

The Chesapeake & Ohio has ordered 187 miscellaneous freight cars from the American Car & Foundry Co. for replacement.

The Chicago, Milwaukee & St. Paul is asking prices on a number of passenger cars in addition to those reported in the *Railroad Age Gazette* of January 29.

The Pere Marquette, reported in the *Railroad Age Gazette* of January 29 as asking prices on 50 forty-ton box cars, has ordered this equipment from the Pullman Company.

The New York Central Lines, reported in the *Railroad Age Gazette* of January 29 as asking prices on from 50 to 80 passenger cars, is now asking prices on 140 passenger cars.

The Spokane, Portland & Seattle, reported in the *Railroad Age Gazette* of December 18 as asking prices on 200 forty-ton box cars, has indefinitely postponed the placing of this order.

The Illinois Traction Co., Champaign, Ill., reported in the *Railroad Age Gazette* of December 18 as in the market for 25 forty-ton box cars, has placed this order with the American Car & Foundry Co.

The Escanaba & Lake Superior, reported in the *Railroad Age Gazette* of January 1, as in the market for 50 forty-ton steel underframe flat cars, has ordered this equipment from the Fitz-Hugh, Luther Co.

The Cleveland, Akron & Columbus, as reported in the *Railroad Age Gazette* of January 29, has ordered 100 freight cars from the Standard Steel Car Co. These cars will be 50-ton box cars with steel underframes.

The Western Maryland, previously reported in the *Railroad Age Gazette* as being in the market for freight cars, has ordered 500 steel underframe box cars and 350 steel hopper cars from the Standard Steel Car Co.

The Pennsylvania, reported in the *Railroad Age Gazette* of January 29 as asking bids on 2,100 new freight cars for Lines West, has ordered 2,200 cars, divided as follows: Cambria Steel Co., 1,000; Pressed Steel Car Co., 500; American Car & Foundry Co., 600, and the Standard Steel Car Co., 100.

### IRON AND STEEL.

The New York, Chicago & St. Louis has ordered 5,000 tons of Bessemer rails from the Illinois Steel Co.

The Chicago & Oak Park Elevated has ordered 1,225 tons of open-hearth rails from the Indiana Steel Co.

The New York, Chicago & St. Louis is said to have ordered 6,000 tons of heavy rails from the Illinois Steel Co.

The Pennsylvania is asking bids on 6,000 tons of structural steel for use on the Trenton avenue elevated lines in Philadelphia, Pa.

The Minneapolis, St. Paul & Sault Ste. Marie is said to be in the market for 500 tons of plate girders for a bridge at St. Paul, Minn.

The Baltimore & Ohio is understood to be about prepared to close contract for its 1909 rail requirements, said to be in the neighborhood of 60,000 tons.

### RAILROAD STRUCTURES.

BATON ROUGE, LA.—The Texas & Pacific is said to have filed plans with the Louisiana Railroad Commission for a passenger station to be built opposite Baton Rouge. Part of the material for the building has been ordered and work is to be started within 30 days.

BEAVER, PA.—In connection with the rebuilding of the passenger and freight stations by the Pittsburgh & Lake Erie, the company proposes to build a subway, it is said, under the four track system at the Beaver end of the new bridge, now under construction over the Ohio river, also to build a boulevard from the new station to West Bridgewater. Shelter sheds are to be put up at either side of the four-track system. It is understood that similar plans have been outlined for the Beaver Falls Brighton passenger station, with the exception of the subway. (August 14, p. 733.)

CHICAGO, ILL.—The Board of Trustees of the Sanitary District of Chicago has given, to George W. Jackson, Inc., Chicago, the contract for the fabrication, erection and completion of the superstructure of the two railway bridges for the Chicago & North Western across the North Shore channel of the Sanitary District of Chicago. The contract price for both structures is \$32,315. (Jan. 15, p. 141.)

See item in another column on Chicago & Alton freight terminals.

DUBLIN, TEX.—The Texas Central has begun the erection of a new freight depot, with dimensions of 106 ft. x 24 ft., to replace the one destroyed some time ago by fire.

GALVESTON, TEX.—The Gulf & Interstate has given the contract to Janssen & Zempter, Galveston, for a new passenger station, 85 ft. x 25 ft.

HATTIESBURG, MISS.—The New Orleans & Northeastern has given the contract to the Jefferson Contracting Co., Birmingham, Ala., for the brick and stone work, costing approximately \$63,500, for its new passenger station. The contract for the steel construction, to cost about \$12,500, has been given to the Chattanooga Steel Co., Chattanooga, Tenn. The building of the express room, which is separate from the station, is included in the contract. Two train sheds, of the umbrella type, each 1,000 ft. long, will also be built. (Jan. 22, p. 189.)

HULBERT, ARK.—See Chicago, Rock Island & Pacific under Railway Construction.

JACKSONVILLE, ILL.—The Chicago & Alton has asked bids on the construction of a new passenger station to cost \$15,000. It will be one story high, 100 ft. wide and will be a brick structure on a concrete foundation. (July 24, p. 597.)

JOLIET, ILL.—See item in another column on Chicago & Alton freight terminals.

KANSAS CITY, MO.—See item in another column on Chicago & Alton freight terminals.

NORTH YAKIMA, WASH.—According to plans filed recently at North Yakima, the North Coast expects to build a large passenger station, freight house, repair shops, roundhouse and coal bunkers, and an ice house with a capacity of 10,000 tons.

RIVER FOREST, ILL.—The Chicago & North Western is having plans prepared by Frost & Granger, Chicago, for a new passenger station. It will be one story high and of brick construction.

SPRINGFIELD, OHIO.—The Detroit, Toledo & Ironton expects to begin work soon on a new office building and passenger depot. The office building will be two stories high. The work will be done by the railway.



### Street Car Fenders for New York City.

The New York State Public Service Commission, First district, which has made elaborate tests of fenders for street cars, held hearings this week with a view to ordering the use of fenders or wheel guards on all surface cars in New York City. The committee which made the tests recommends that all such cars have two automatic wheel guards, to be attached to the trucks, and that in addition, fenders of a projecting type be put on all cars except those running in the most congested streets. Cars running both in thickly settled and thinly settled parts of the city should have fenders to be used a part of the time, to be tied up out of the way when desirable to do so. At present the cars of the Metropolitan Street Railway lines in Manhattan have no projecting fenders, but they have wheel guards. On the Third avenue line the cars have neither guards nor fenders. The cost of the fender tests was about \$8,000, an average of \$4.44 for each test, which, in view of the large number of casualties reported in New York city—indicating great need of life-saving apparatus—the commission regards as a very moderate expenditure. The Commission has issued in pamphlet form a full and careful report of the tests.

### United States Wood Preservers' Association.

The fifth annual meeting of the United States Wood Preservers' Association was held in the Auditorium Hotel, Chicago, January 19, 20 and 21. President Walter Buehler, Expert Engineer of the Kettle River Quarries Co., Minneapolis, Minn., was in the chair. This association now numbers 52 members, of which some thirty were in attendance at the meeting. Secretary C. W. Berry (Union Pacific R. R.) read statements he had prepared, giving the total amount of material treated by the different preservative processes in the United States in the year 1907, and a comparison of the material treated in 1906 and 1907, these statements being made up from information furnished by members. Following is a summary of these statements:

	1906.	1907.	Increase.	Av. amt. injected per cu. ft. in 1907.
<i>Creosote.</i>				
Cu. ft. of piling .....	5,358,827	6,024,169	665,342	13.00 lbs.
" " lumber .....	3,834,241	4,561,327	727,086	11.00 "
" " bridge timber ..	861,743	1,124,035	262,292	12.25 "
" " switch ties .....		563,415	563,415	8.33 "
" " paving blocks ....	1,764,233	2,874,560	1,110,327	14.00 "
" " cross arms .....	122,612	238,742	116,130	10.00 "
Net increase .....			3,444,592	
Number of ties treated....	1,836,983	5,750,874	3,913,891	
<i>Zinc-chloride</i>				
Cu. ft. of piling .....	11,657		*11,657	
" " lumber .....	365,411	74,564	*290,847	0.51 lbs.
" " bridge timber ..	34,887	45,671	10,784	0.37 "
" " switch ties .....	404,736	280,215	*124,521	0.35 "
Net decrease .....			416,241	
Number of ties treated....	14,168,784	9,864,765	*4,304,019	
<i>Zinc-oil.</i>				
Cu. ft. of piling .....	211,568	265,485	53,917	.....†
" " lumber .....	5,691	9,456	3,765	.....†
" " switch ties .....		47,356	47,356	.....†
Net increase .....			105,038	
Number of ties treated....	918,691	2,345,670	1,426,979	
<i>Zinc-Glue-Tannin.</i>				
Number of ties treated....	907,775	476,675	*431,100	0.50 lbs.
*Decrease.				
†Zinc, 0.25-lb., oil, 3.0 lbs.; same amounts for all three materials.				
<i>Recapitulation.</i>				
Net increase, cubic feet of piling .....			707,602	
" " " " lumber .....			440,004	
" " " " bridge timber .....			273,076	
" " " " switch ties .....			486,250	
" " " " paving blocks .....			1,110,327	
" " " " cross arms .....			116,130	
Total net increase, cu. ft., material treated*..			3,133,389	
Total net increase of cross ties treated.....			605,751	

\*Not including cross ties.

There were no committee reports or prepared papers, the programme, instead, consisting of topical discussions on various subjects of interest to the members. These subjects were as follows:

Heart woods which can be treated.

The treatment of dead timber.

The proper grouping of timber for treating.

Inflammability of treated timbers.

Quantity and quality of creosote for treating piling.

The use of crude oil as a timber preservative, and the best method of application.

Should an attempt be made to air-season timber before treating in the southern part of the United States?

What is the best power for moving ties and material throughout the yard and into the retorts?

Treating in open tanks.

Experience in injury to men from handling treated timbers.

Effect of timbers treated with creosote and zinc chloride on electric currents passing through other materials in contact with the timber.

In addition to the foregoing, Octave Chanute sketched briefly the history of timber preservation in America, and others made supplementary statements concerning the same.

Some of the subjects given were only briefly discussed, while others were gone into more at length. The object of the committee on subjects in introducing the first topic on the list, "heart woods which can be treated," was to get the experience of the members as to what heart woods can be treated. Carl G. Crawford (Amer. Creos. Co.), formerly chief of the office of wood preservation, United States Department of Agriculture, thought up to recently that treatment of heart woods with creosote was impossible, but had found that heart woods of certain species can be treated, some of them very easily—red oak and black gum, for instance. He also understood that hickory, maple and birch heart wood can be treated as easily if not more so than the sap wood.

In reference to the treatment of dead timbers, the committee had in mind the quantities of fire-killed timbers to be found in the West, and also certain kinds of bug-killed timber, said to be perfectly sound if cut soon after it is killed, and to make good ties. C. W. Berry (U. P.) said they did not consider it well to use dead timber unless obtained shortly after it is killed, before there is any sign of decay. Roadmasters and section foremen had confirmed his observations that it will not last as long in track as live timber; also the zinc chloride leaches out more readily. F. J. Angier (C., B. & Q.) said they treat a good many thousand ties from what is known as bug-infested timber. It takes the solution readily, as high as 110 per cent. absorption, and they expect a life of 10 or 12 years for these ties. Mr. Berry said that a good many railways won't accept dead timber ties, from unsatisfactory experience with them. Mr. Chanute said the bulletin of the Department of Agriculture on dead timber says it makes good ties.

On the topic of proper grouping for treatment, E. B. Fulks (Rock Island), for the committee, said that theoretically not only should each variety of timber be treated separately, but the different species should be separated, and even the same species grown under different conditions; but this, of course, was impractical. The grouping adopted at different plants depends on the locality. A. Gibson gave the grouping for the Brainerd, Minn., and Paradise, Mont. (creosoting) plants of the Northern Pacific. At the former, red oak and jack pine are treated alone; birch, ash, elm and maple together. At Paradise, red fir is treated alone; white fir, yellow pine and white pine together, and jack pine and lodge-pole pine together. Mr. Angier said the Burlington has three classes—A, B and C. Timber absorbing under 20 per cent. in volume of the preservative is in class A; between 20 and 30 per cent., class B, and over 30 per cent., class C. The first includes oaks, hickory, tamarack, beech, ash and hemlock. The second, gum, chestnut, hard maple, Douglas fir and sycamore; the third, loblolly pine, soft maple, elm, birch, poplar and cottonwood. These timbers come to them in mixed lots, it being considered cheaper to sort them at the plant than before shipment. The cost in the latter instance is about 1¼ cents a tie. Mr. Gibson said the Northern Pacific has its timbers separated before shipment.

It was pointed out that not only should timbers be grouped according to species, for treatment, but also with reference to sizes, to get uniform absorption. J. B. Card (Chgo. Tie Pres. Co.) said this was true for creosote, but with zinc chloride, where the timber was being treated to the refusal point, size was not a factor, as all of the timber would receive the same unit amount of the preservative. Mr. Chanute mentioned that the length of the pieces was a much more important factor than the cross-section, as two-thirds of the preservative goes in at the end of a piece.

The discussion of the topic "inflammability of treated tim-

bers" consisted mostly of citations of instances, coming under the observation of members, of creosoted timbers which had been exposed to fire and had not burned as readily as untreated timber. It was the opinion of the committee on subjects that properly seasoned creosoted timber is not as inflammable as untreated timber. Mr. Chanute said this was well known, but that when creosoted timber once got to burning it was very difficult to extinguish.

In the discussion of "the quantity and quality of creosote for treating piling," Mr. Crawford said that such instances as he knew of timbers failing through attacks of sea worms were due to the use of inferior qualities of oil. R. J. Calder (I. C. & C. Co.) said such failures also resulted from too light treatment with good oil. In regard to the quality of creosote, Mr. Calder said there is still so much uncertainty about this, that in all the experiences his company has had they have never been able to come to any satisfactory conclusions on this point.

Speaking of the use of crude oil as a preservative, G. E. Rex (Santa Fe) told of the results obtained thus far on his road. They use California (Bakersfield) oil having a heavy, 75 per cent., asphaltum base. On their 7-in. x 9-in. ties they get an absorption of 55 lbs. per tie, and on their sawed, 7-in. x 8-in. ties, about 40 lbs. The asphaltum is expected to exclude the moisture and thus prevent decay of the wood. As the method has not been in use long, the results are only experimental as yet, though they expect it to be a success and to grow in use. The species they treat are the pines of New Mexico and Arizona. This oil can be exposed in a pan for a year without perceptible evaporation.

The Texas oil, on the other hand, which has a paraffine base, is not a preservative. But Titusville (Pennsylvania) oil, also having a paraffine base, acts as a good preservative so long as the timber is kept saturated. The Texas oil has a great deal of sulphur, this being the difference between it and the Pennsylvania product.

The topic on "air seasoning" was limited to the southern part of the United States because of the fact that decay sets in so quickly in cut timbers in that section. According to members from that part of the country the limit of time for air seasoning there is three or four months, so that though they may prefer thorough air seasoning before treating, they must be governed by natural conditions.

On the topic of best motive power for use around preserving plants, J. B. Card said that in conjunction with the hoist and cable system they use a 10-ton locomotive crane for loading and unloading cars, piling ties, etc., and also for moving tram cars which are out of the zone of the cables and hoists to within reach of same. They can unload ties for about 75 cents a thousand, and pile them 30 ft. in the air and 100 ft. from the track. The latter is accomplished by chaining them in bundles after removal from the car, lifting them by the crane to the top of the pile, the men then skidding them across the top to whatever point desired. He pointed out the economy in yard space and tracks this means. Mr. Buehler said that after careful investigation of every system now in use (except the locomotive crane, which he hadn't previously known about) they had adopted an oil-burning industrial locomotive. He asked how the locomotive crane was used for loading ties into box cars. Mr. Card said that as these were creosoted ties they were not allowed to put them in box cars, therefore they use stock cars. These are cut, and separated far enough to put a supporting platform between. The crane lifts the loaded tram car on to this platform and the ties are shoved through the end door of the car.

Coming to the "open tank treatment," Mr. Fulks said that while it was a good method under certain special conditions, harm was going to result from it if continued in the direction now headed, as it was unsuited to many of the uses to which it is now applied. As to comparing it to the closed tank, or pressure method, he said such a comparison was impossible because of their total dissimilarity, there being no common basis for comparison.

The topic "experience in injury to men from handling treated timbers," Mr. Fulks explained, was prompted by the fact that the railways every now and then are made defendants in damage suits brought by section men and track laborers who claimed to have been injured—poisoned—by handling treated ties. If such a thing were possible or had

ever occurred he did not know of it and he thought all of the members of the association should be on record in its Proceedings as to whether or not any such injury had come under their observation or within their experience. Accordingly, the following questions were prepared by a committee and all of the members asked to answer in writing:

How long have you been connected with the operation of a timber-treating plant?

What preservatives have you used?

To your knowledge have any employees been in any way injured by the action of the preservative: (a) At the treating plant? (b) After the treated material has been delivered at the place it is to be used?

The result of this canvass will not be known for some days as the questions must be sent to members not in attendance at the meeting.

The last topic on the list was discussed only briefly, and will be taken up in some form at the next meeting, none of the members present having any experience with or knowledge of the subject.

The officers of the association for the ensuing year are: President, Walter Buehler (Kettle River Quarries Co.), re-elected; First Vice-President, David Allerton (Amer. Creos. Co.); Second Vice-President, H. J. Valentine (E. & R. Creos. Co.); Third Vice-President, H. M. Rollins (T. & N. O. Wood Pres. Wks.); Secretary-Treasurer, C. W. Berry (Union Pacific R. R.), re-elected. Chicago was again chosen as the place of meeting.

## Supply Trade News.

The McClintic-Marshall Construction Co., Pittsburgh, Pa., has opened an office in the Central building, Seattle, Wash. C. F. Boyce is the Sales Representative in charge.

The O. M. Edwards Company, Syracuse, N. Y., will furnish window fixtures for three passenger coaches for the Green Bay & Western, now building at the Hicks Locomotive & Car Works; design No. 13-01 will be used.

The Northern Engineering Works, Detroit, Mich., recently supplied traveling cranes to the Black Hills Traction Co., Deadwood, S. Dak.; one 3-ton crane to the New Phoenix Foundry & Machine Co., Springfield, Mo.; one 15-ton crane to the city of Oswego, N. Y.; and two 7½-ton traveling cranes to the Western New York Construction Co.

J. F. Hinckley, Chief Engineer of the St. Louis & San Francisco, has resigned to engage in private practice as a consulting engineer, with offices in the Syndicate Trust building, St. Louis, Mo. Mr. Hinckley is a member of the American Society of Civil Engineers, the American Railway Engineering & Maintenance of Way Association, and the Engineers' Club of St. Louis.

An inspection report from the Westinghouse turbine plant of the Hampton Company, East Hampton, Mass., covers a period of 2½ years of continuous service since August, 1905. The turbine was recently inspected internally and found in excellent condition. It is said that the blading was apparently in as good condition as when installed and showed no signs of wear or corrosion.

John Cargill has taken a position with Robert W. Hunt & Co., Chicago. His headquarters will be at the firm's New York office, 90 West street. He will devote particular attention to the examining and reporting on railway and other corporate properties, for which his experience gained while connected with the Pennsylvania Lines, the British Westinghouse Company, the Metropolitan Railway Co. of London, and other organizations, has prepared him.

David J. Evans, Manager of Sales of the Chicago office of the Rail Joint Company, New York, has resigned, effective March 1, and will give his personal attention after that date to the interests of the Andresen-Evans Co., Chicago, in which company he has been interested since its organization. Prior to his association with the Rail Joint Company, Mr. Evans was for a number of years connected with the Chicago office of the Lorain Steel Co., and also the North American Railway Construction Co. The Andresen-Evans Co., as engineers, has



developed new types of ore and coal unloading and conveying bridges, grab buckets, etc.

James E. Simons, Fisher building, Chicago, as reported in the *Railroad Age Gazette* of January 15, has been appointed Northwestern Representative of the Composite Board Co., Niagara Falls, N. Y. Through a typographical error, it was stated in the item referred to that the Composite Board Co. manufactured an inflammable board for the interior lining of steel cars. Of course, this should have read a "non-inflammable board." The company also manufactures a plain board for headlinings and interior decorations for passenger cars and steamboats that will take an excellent finish and can be furnished in large sizes.

Edward C. Brown, Manager of the Hawaiian office of the Dearborn Drug & Chemical Works, Chicago, is making a trip of three or four months to Japan, the important seacoast cities of China, Australia, the Philippines, Java, and other important islands in the Pacific ocean. Mr. Brown has handled the Dearborn company's business in the Hawaiian islands since that department was opened, some ten years ago. The company reports that the general business of the whole company for the last six months of 1908 was larger than for any six months in its history, indicating the quick return of prosperous business conditions.

Frank W. Noxon has been chosen Secretary of the Railway Business Association, succeeding George M. Basford, who, for the past two months, has been Acting Secretary. It has become necessary for Mr. Basford to devote his time exclusively to his duties as Assistant to the President of the American Locomotive Company. Mr. Noxon has had an extended experience in newspaper work both as editor and special contributor. He has been engaged for about fifteen years in newspaper work in Boston, having been connected with the *Advertiser*, the *Traveler*, and the *Herald*. He has acted as Assistant Secretary of the Railway Business Association since its formation.

The Inter Ocean Steel Co., whose organization was noted in our issue of January 8, has secured 80 acres of land at Chicago Heights, Ill., on which its plant will be built. The tract is on the line of the Elgin, Joliet & Eastern, fronting 3,000 ft. on the same, and also has direct connection with the Michigan Central and the Chicago & Eastern Illinois. The plans, which are being prepared by Julian Kennedy, who has resigned from the Railway Steel-Spring Co., New York, will be pushed as fast as possible. The capital stock of the company is \$2,500,000, instead of \$2,000,000, as previously noted, and the latter amount will be spent on the plant and equipment. In addition to the products mentioned in the previous note, the plant will also make rolled shells for crushing machinery, and rolled steel pipe flanges. W. V. D. Wright, formerly President of the Wright-Thiffault Co., Chicago, has been elected Treasurer of the new concern. The office of the company is in the Railway Exchange building, Chicago.

The Brighton Car Co., Chicago, as mentioned in the *Railroad Age Gazette* of November 27, has bought 40 acres of land at St. Louis Park, a suburb of Minneapolis, Minn., for a new car manufacturing plant. The plans include a blacksmith shop, machine shop, storeroom and mill. Work on these, except the mill, is now progressing rapidly, and it is expected the plant will be in operation by March 1. The mill, which is completed, is 100 ft. x 50 ft. Additional storeroom space has also been provided by turning a building already on the grounds into a storeroom. This structure is 90 ft. x 150 ft. There will be an initial trackage capacity for 125 cars, to be increased later as needed. From 250 to 300 men will be employed at the start. The company at first will confine its work to the repair and rebuilding of freight cars of all types, but it is probable that machinery will be installed soon after the plant is in operation that will enable it to build new cars.

Most of the machinery required, including generators, motors, milling machinery, etc., has been bought. Frank Kellerman, President of the Brighton Car Co., will be President and General Manager of the new works, which will be known as the Minneapolis Car Co. W. J. Grogan will be Superintendent.

Samuel Addison Megeath was on January 27 elected Vice-



S. A. Megeath.

President and General Manager of the Galena-Signal Oil Co., Franklin, Pa. He had formerly been Vice-President of the company but resigned this office in March, 1907, to take charge of the foreign department of the concern. He was born in Omaha, Neb., in 1869, soon after his parents had gone there from Virginia. After a college education he went into the stationery business. In 1895 he went to the Galena-Signal Oil Co. and became Vice-President. Mr. Megeath will have offices both at Franklin, Pa., and at 26 Broadway, New York.

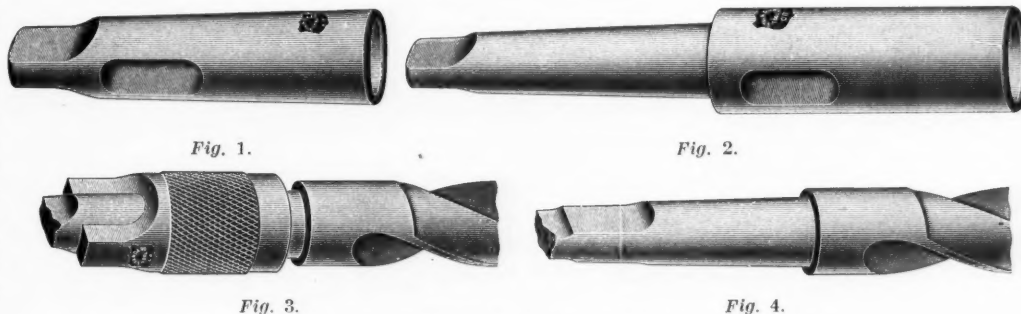
#### TRADE PUBLICATIONS.

*Calendar.*—The Falls Hollow Staybolt Co., Cuyahoga Falls, Ohio, is distributing a very handsome calendar on which the painting by Henry P. Smith of Washington's home at Mount Vernon is reproduced.

*Thermit Repairs.*—The Goldschmidt Thermit Co., New York, has recently issued a pamphlet which contains half-tone reproductions made from photographs of a number of specimens of repair work done by the use of thermit. These specimens cover both track and shop work.

#### Economy Short Sockets and Sleeves.

To meet the growing demands for a device to utilize the large number of taper shank drills which are rendered useless on account of broken or distorted tangs, caused principally by worn or poorly-fitting sockets, the Standard Tool Co., Cleveland, Ohio, is making Economy short sockets and sleeves, shown in the accompanying Figs. 1 and 2. These are very similar to the regular sockets and sleeves now on the market, excepting that the slot for removing the drill or other tool is lower and of larger dimensions.



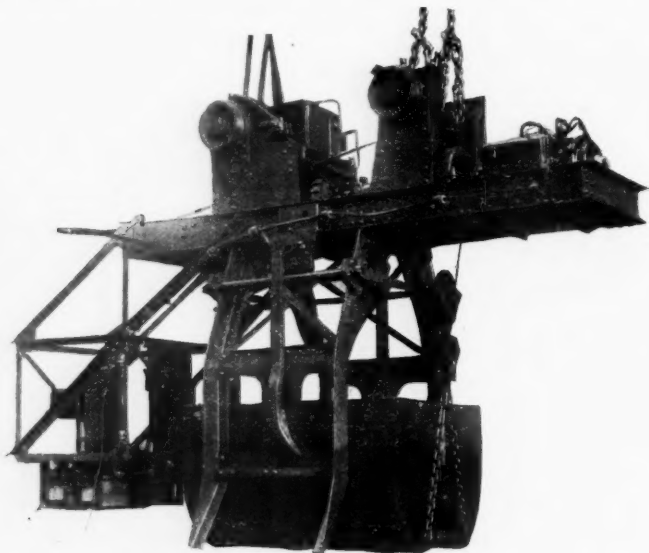
Economy Short Sockets and Sleeves.

To provide a new tang to fit these sockets, the Economy tang gage is used. By slipping it over the shank of the broken drill, as shown in Fig. 3, a new tang of correct size and position can be marked out. It is then shaped either by milling, planing, filing or grinding. The new tang is heavier and stronger than the old one, as shown in Fig. 4, and it also insures an accurate and powerful drive.

The shanks of the Economy sockets and sleeves are made of regular dimensions and will fit the spindles of all the leading makes of power drill presses. This method of using broken tang drills is inexpensive and should appeal to the practical mechanic.

### Ash Handling Trolleys.

The accompanying photograph shows one of a pair of 3-ton, 2-motor, electric ash handling trolleys recently installed by the Brown Hoisting Machinery Co., Cleveland, Ohio, for the Birmingham Railway Light & Power Co., at Birmingham, Ala. These trolleys were built to



Ash Handling Trolley.

replace trolleys running on a single I-beam and it was decided that more satisfactory results could be obtained by using a double line of rails fastened to the top of I-beams for the runway track. The capacity of the bucket is 50 cu. ft. As it was always possible to dump the

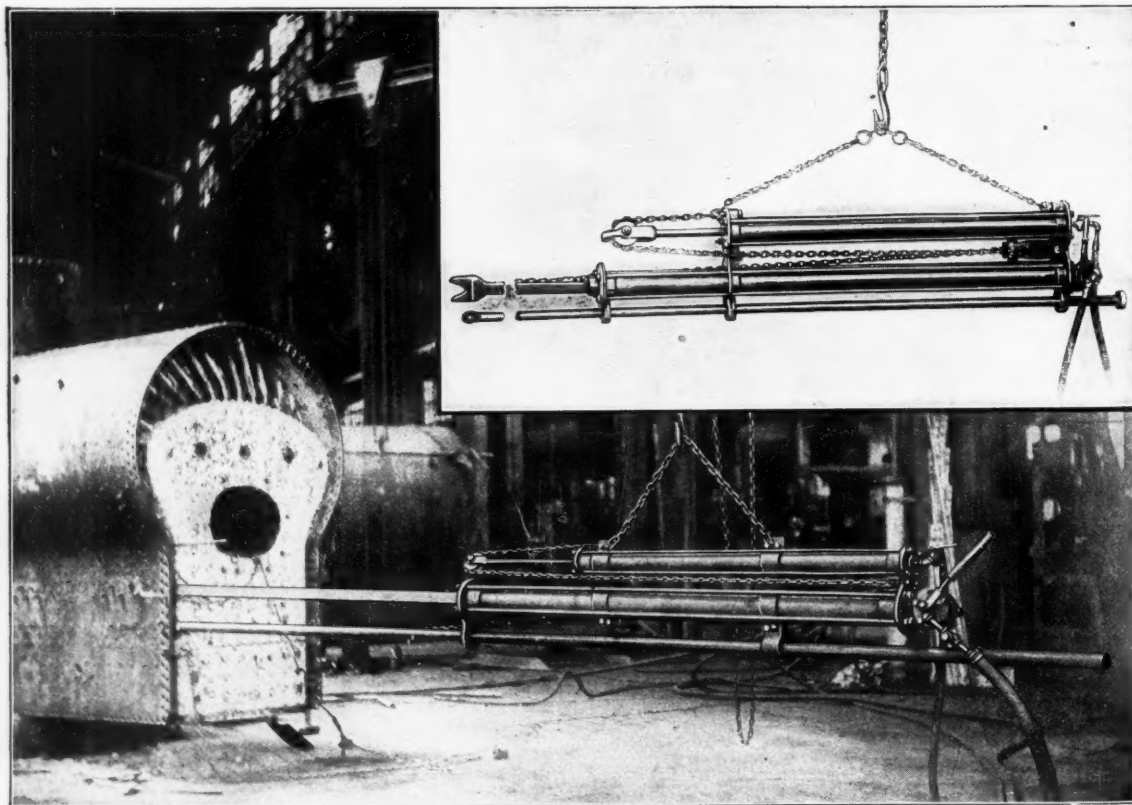
load cannot be lowered without reversing the motor. In case anything should happen to the mechanism, the hoisting mechanism would be instantly stopped and the load safely suspended. There is also a solenoid brake which is set at all times, when the current is cut off, and which also serves to check the rotation of the armature when the bucket has reached the limiting position either in hoisting or lowering. The machine has speeds of 40 to 50 ft. per minute for hoisting the load, and 600 to 650 ft. per minute for trolley travel. In order to keep the motors alike, and make as many parts as possible interchangeable, the hoisting and racking motors are made the same size.

A hand brake is used on the racking mechanism. This brake, together with two controllers, placed in the cage, allow the operator to control all movements of the bucket and trolley. To prevent the operator running the bucket into the bumper at the extreme height of the hoist, a safety limit switch is provided which cuts out the current when the bucket reaches a certain point and thus prevents it from running into the bumper with force enough to do any damage. To dump the load the bucket is simply hoisted into the carrying hooks, the hoisting ropes are then slackened off, the doors of the bucket open and the load is dumped. As the bucket had to be lowered through hatches between the rails of the railway tracks at the floor level to be filled, the corners of these hatches were protected by 6 x 6 in. angles flaring out at the top. These angles also serve to guide the bucket through the openings.

This equipment has proven thoroughly satisfactory in actual service and makes a simple and cheap arrangement for handling ashes where conditions are such as were found at this plant.

### The Lowe Staybolt Breaker.

A pneumatic staybolt breaker which has been in use in the Silvis shops of the Rock Island for more than a year is shown in the accompanying illustration. There are two parallel cylinders, the upper one of which holds the device up to the work, advancing it automatically as the bolts are broken. This is done by the chain passing around the sheaves respectively on the take-up cylinder piston rod and at the back end of the device, thence to the boiler, to which it is attached. The guide bar under the driving cylinder is likewise fastened to the



The Lowe Staybolt Breaker.

load in its highest carrying position, it was decided to use a single rope system and suspend the bucket in carrying hooks when it was desired to dump. Because of this arrangement, the mechanism is very simple and constructed with the fewest possible number of parts.

All gears are encased in cast-iron coverings, so as to be entirely protected from dust and dirt and at the same time the cases are arranged to allow easy access to all gears and bearings for lubricating. The machine is equipped with a safety lowering device, so that the

boiler shell and is moved up or down to bring the breaker bar in line with the row of bolts to be broken.

Both cylinders are 4 in. in diameter, the upper one being 5 ft. 8 in. long and the lower one 7 ft. 9 in. long, the length of travel of the breaker bar at one setting being 9 ft. 6 in. The machine works under air pressures of 80 to 150 lbs., doing best at from 100 to 125 lbs. A pressure of 100 lbs. in the take-up cylinder brings a force of some 1,200 lbs. against the bolt in addition to the blow of the breaker bar.



assisting effectively in the work of the latter. The machine is operated by the valve at the back end of the driving cylinder. In the engraving the valve handle in the lower view is in position for the return of the ram after a stroke. To advance the ram the handle is thrown to the corresponding position forward. One to three blows are required to break a bolt. The blows are delivered as fast as the operator can move the handle, which is easy to move.

The device has a record of breaking a row of twenty-eight  $\frac{1}{8}$ -in. staybolts in three minutes. A boilermaker and helper can break the staybolts in a boiler of the largest size in 11 to 14 hours, while the danger of personal injury is practically eliminated. The maintenance cost of the device is low. It has been run an average of four days a week for more than a year and has cost only about \$5 for repairs, exclusive of breaker bars. Air is supplied through a 1-in. hose. The machine was devised by Grover S. Lowe, a machinist in the Silvis shops. Williams, White & Co., Moline, Ill., have the manufacturing and selling rights.

#### Roney Mechanical Stokers.

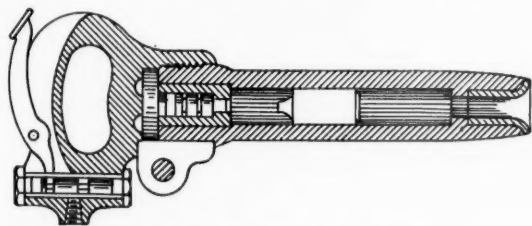
The Westinghouse Machine Co., Pittsburgh, Pa., builder of the New Model Roney mechanical stoker, reports a large business in boiler-plant equipment for the last three months. The more important orders cover some thirty or forty equipments for various types of boilers in many different classes of service. Of these, government and state institutions have contracted for 17 stokers. The Public Service Corporation, Jersey City, N. J., has adopted this type of stoker after competitive tests, 15 equipments being ordered for the present. Other orders from traction lines include: Kentucky Electric Co., Louisville, Ky.; Youngstown Heating Co., and the Nassau Light & Power Co. Further orders have come from the New York, New Haven & Hartford shops at Readville. The National Tube Co., Pittsburgh, Pa., which already operates a number of Roney stokers, has ordered more, as well as the Crescent Portland Cement Co., Wampum, Pa., the United Shoe Machinery Co., Boston, Mass., and the Newport Mining Co., Ironwood, Mich. There have been a number of orders for change-overs for remodeling present stoker equipments along the lines of the New Model stoker. A number of trial orders are also being made for the purpose of trying out the new improvements.

#### Helwig Pneumatic Hammer.

The Helwig pneumatic hammer shown in the accompanying illustration is designed to meet the demand for a pneumatic hammer of large capacity, simple design and substantial construction. It is said to be one which is convenient to handle, easy of operation and low in cost of operation and maintenance.

The valve, of piston type, is balanced and has a large wearing surface. It is made of solid tool steel, hardened and ground, and as it operates in the same direction as the piston the wear on it is claimed to be reduced to a minimum and the full power of the air is utilized for effective work. The one-piece valve chamber, also hardened and ground, is imbedded firmly in the barrel to prevent its being displaced while the hammer is in use and at the same time being readily removable for inspection or repair. The piston is a solid piece of tool steel, also hardened and ground. The drop forged steel handle is of the closed type. The hose connection is located at right angles with the barrel on the lower side of the handle and so placed as to be of the least hindrance to the operator. This is claimed to make a considerable saving in the wear and tear on the hose, as well as the threaded connection to the handle. A simple locking device is provided to prevent the handle from working loose.

The hard, metallic blow is said to be absent in this hammer and the ease of operation, in consequence of this fact, greatly lessens the



Helwig Pneumatic Hammer.

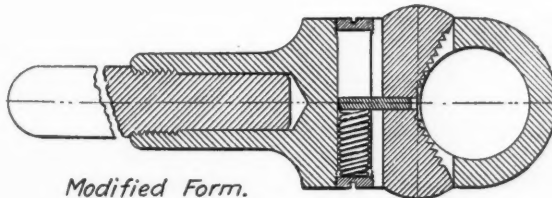
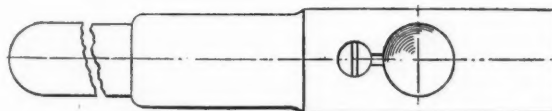
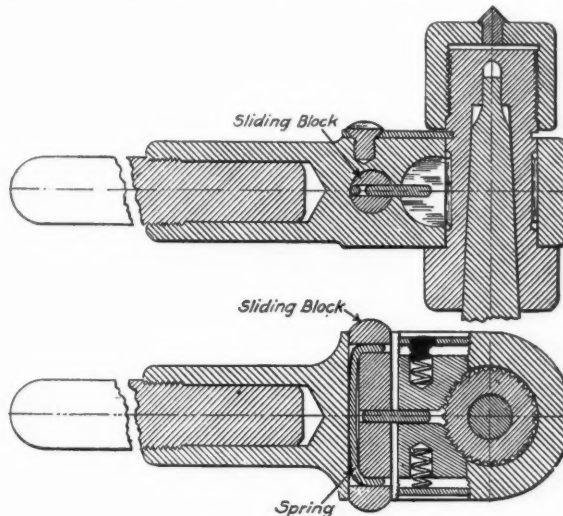
fatigue of the operator. The rivet hammer made by this company is designed to deliver a sharp, powerful and speedy blow. The chipping hammer, of faster cutting speeds than the other hammers, may be regulated as to speed and weight of blow. It is claimed that a 4-in. stroke chipping hammer, used for riveting, will drive  $\frac{3}{4}$ -in. rivets steam tight.

The Helwig Manufacturing Co., St. Paul, Minn., manufacturer of this hammer, claims its durability as a strong feature; also that its few parts, none of which are delicate, are of simple design and substantial construction.

#### Reversible Ratchet Wrench.

Arthur Munch, tool room foreman of the St. Paul shops of the Chicago, St. Paul, Minneapolis & Omaha, has patented the reversible ratchet wrench shown in the accompanying drawings. He provides two jaws, so engaging the tool holder as to turn it in opposite directions, with means for moving one or the other of the jaws out of engagement, depending on the direction of rotation of the tool holder. This is done by means of the slidable piece or block back of the jaws, having a pin projecting between the latter, and a friction spring to hold the slide to position. By pushing this slide to right or left the corresponding jaw is moved free of the tool holder and held so.

A modified form of this design has a single-piece jaw with a rearwardly projecting pin having a coil spring pressing against one side, as shown. To insert a tool holder the jaw must be pressed into a



Modified Form.

#### Reversible Ratchet Wrench.

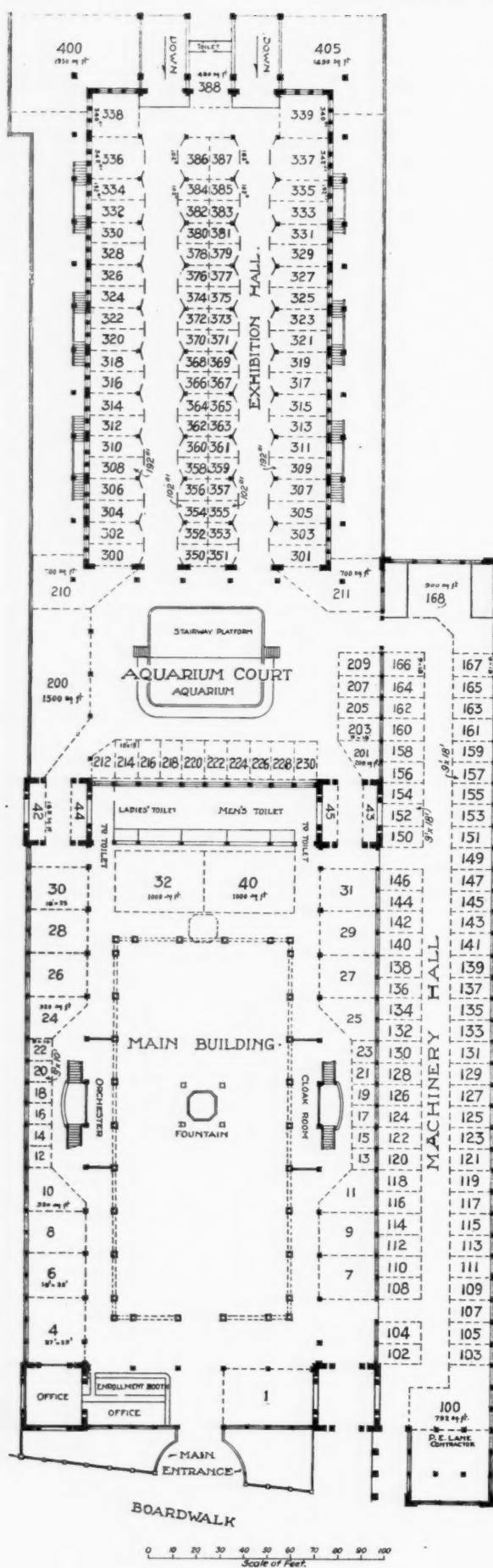
central position as shown in the lower illustration, the wrench being ready in this instance for left-handed operation. For use in the reverse direction the tool holder is simply inserted from the opposite side.

#### Nelson Valve Company Extension.

The Nelson Valve Co., Philadelphia, Pa., whose works are at Wyndmoor, in Montgomery county, just outside the city limits, has been incorporated in Pennsylvania, and given up its New Jersey incorporation. The company began in 1893 to manufacture valves of all kinds under the Nelson patents. It now employs from 200 to 250 men, the majority of whom are skilled mechanics, and it is now proposed to largely increase its facilities.

The new charter under the laws of Pennsylvania will empower the company to manufacture and sell pipe, valves, machinery, fittings and steam specialties. The authorized capital will be \$1,000,000. The President of the new company, who was also President of the old one, is Samuel F. Houston, who is Vice-President of the Real Estate Trust Co., the Winifrede Coal Co., and the Winifrede Railroad Co. Carlisle Mason is the Vice-President and, as heretofore, General Manager; and Russell Bonnell is Secretary-Treasurer. Henry H. Bonnell is also one of the incorporators.

The company is now manufacturing a new valve calculated to stand the pressure of super-heated steam, no matter what degree of heat



the steam will register. The new valve, which will be of large diameter chiefly, is being made of high-grade cast-steel, reinforced with nickel, so as to protect it from the action of the steam.

The new buildings, now in course of erection at Wyndmoor, are of reinforced concrete. It is expected that the new buildings will be ready for occupancy very shortly. The company has a selling office in the Real Estate Trust building, Philadelphia, and will shortly open a general office in that city, where the principal office will be located.

### Atlantic City Exhibits.

The accompanying diagram shows the arrangement of exhibit spaces on Young's Pier, Atlantic City, N.J., for the June conventions of the American Railway Master Mechanics' and the Master Car Builders' Associations. The table gives a summary of the space dimensions.

#### SUMMARY OF SPACE.

Annex Court and Annex.			Exhibition Hall.		
Space Nos.	Front-age by depth, in ft.	Area, each space, sq. ft.	Space Nos.	Front-age by depth, in ft.	Area, each space, sq. ft.
400	Irreglr.	1,950	300-335 (odd & even)	Irreglr.	192
405	Irreglr.	1,490	336-337	Irreglr.	342
407-411 (odd)	10x20	200	338-339	18x20	360
410	Irreglr.	1,070	350-385 (odd & even)	Irreglr.	102
413-451 (odd & even)	10x14.2	142	386-387	Irreglr.	182
454	27x20	540	388	18x27	480
455	30x20	600			
456-497 (odd & even)	10x15	150			

Aquarium Court.			Machinery Hall.		
Space Nos.	Front-age by depth, in ft.	Area, each space, sq. ft.	Space Nos.	Front-age by depth, in ft.	Area, each space, sq. ft.
201	Irreglr.	208	100	Irreglr.	792
203-209 (odd)	9x18	162	102-167 (odd & even)	9x18	792
200	Irreglr.	1,500	168	Irreglr.	900
210-211	"	700			
212	"	120			
214-230	10x15	150			

Main Building.		
Space Nos.	Front-age by depth, in ft.	Area, each space, sq. ft.
1	38x23	875
4	27x25	675
6-9 (odd and even)	18x25	450
10-11	Irreglr.	320
12-23 (odd & even)	9x10	90
24-25	Irreglr.	320
26-31	18x25	450
32-40	40x25	1,000
42-45 (odd & even)	24x7	162

